PBS KIDS

Teaching Tips

1st Grade

Animal Adaptations

Inspire Children to Think Like Scientists through Connected Learning

Animal Adaptations

TABLE OF CONTENTS

Unit Overview: Lessons 1–4

	LESSON 1	LESSON 2	LESSON 3	LESSON 4
NGSS: Animal Adaptations	1-LS1-1: From Molecules to Organisms: Structures and Processes—Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.			
Big Ideas	Animals develop different physical characteristics to help them meet their needs and survive.	Humans can design solutions by mimicking how animals use their physical characteristics to help them survive and meet their needs.	Some physical characteristics help animals meet their needs and survive by enabling them to adapt to their surroundings and hide from predators and prey.	Animals develop different physical characteristics to help them meet their needs and survive. Humans can design solutions by mimicking how animals use their physical characteristics to help them meet their needs and survive.
Key Vocabulary	physical characteristic, adaptation, survive, observe, habitat	fossa, lemur, fearsome, predator, prey, powerful, mimic	camouflage	analyze, conclude, data, experiment, hypothesize, record
Texts	*What Do You Do with a Tail Like This?* by Steve Jenkins and Robin Page	*Fossa: A Fearless Predator* by Meish Goldish	• *I See a Kookaburra!: Discovering Animal Habitats Around the World* by Steve Jenkins and Robin Page • *Nothing Like a Puffin* by Sue Soltis • *Hop* by Jorey Hurley • *Who Can Live in the Mountains?* by Sheila Anderson • *Who Can IIve in the Forest?* by Sheila Anderson	• *A Warm Winter Tail* by Cassie A. Pearson and Christina Wald • *Animal Defenses: How Animals Protect Themselves* by Etta Kaner • *Creature Features* by Steve Jenkins and Robin Page • *Have You Ever Seen a Duck in a Raincoat?* by Etta Kaner • *Hop* by Jorey Hurley • *Who Has These Feet?* by Laura Hulbert
Videos	*Swimming with the Lobster*	*Fossa Hunting*	*Wintertime Creature Powers*	
Digital Games		Aviva's Powersuit Maker in challenge mode	Aviva's Powersuit Maker in experiment mode	
Investigation				Which color coat (black or white) helps an animal stay warmer in winter?
PBS KIDS ScratchJr	Scene 1: Learn how animals develop physical characteristics to meet their needs and survive.	Scene 2: Animate one of the Kratt brothers wearing the powersuit of the animal you are writing about.	Scene 3: Hide an animal from its predator.	
Home Connections	Family Letter	Family Letter	Family Letter	Family Letter

Teaching Routines

Maintain Brisk Pacing

Research demonstrates that "brisk" pacing is related to greater content coverage, increased motivation and engagement, and higher levels of student achievement.

- Consider the time necessary to complete each component of the lesson. Monitor the length of your teaching and children's turns so that all activities are completed within the allocated time.
- Establish a predetermined system for calling on children to work at the whiteboard when using it for whole-class activities. For example, write each child's name on a Popsicle stick and place the sticks in a jar. To call a child to the board, draw a stick from the jar. When a child's name is selected, set that stick aside, leaving only the sticks of children not yet chosen.
- Invite all selected children to the whiteboard at once when more than one child will be playing a game or completing a task.

Engage All Children

When children are highly focused and engaged, they attain higher levels of achievement.

- If you have a document camera (such as an ELMO®), it is useful to display the books that you read aloud.
- During digital gameplay, position children so they do not block the screen when they stand at the whiteboard.This will allow everybody to see the videos, games, images, and activities.
- Involve all children in thinking about the correct answers even if it is not their turn at the whiteboard.
  - Use strategies such as "**Turn and Talk**." For example, ask all children to tell a partner the answer they would choose, or if they agree/disagree with a stated choice. Keep this brief; 30–45 seconds provides most children sufficient time to share their ideas.
  - When the child at the whiteboard gives an answer, invite all the others to show "thumbs up" if they agree with the answer or "thumbs down" if they disagree.

Teaching Routines CONTINUED

Use Key Vocabulary Frequently

When children have many opportunities to hear and use new vocabulary words, they are more likely to acquire and use the words on their own.

- Repeat key words as often as possible during the lesson, as well as during other parts of the school day when use of these words is appropriate.
- Prompt children to use key words as they respond to books and videos, play games, and create and share reports.

Support Scientific Thinking and Reasoning

Research indicates that first-hand investigations coupled with "sense-making discussions" support children's development of conceptual knowledge, learning strategies, and scientific mental models.

- Respond to students' observations by asking for evidence of their scientific thinking. For example, **What evidence did you find to support that idea?** or **Why do you think that?**
- When conducting an investigation, try it out on your own first under typical classroom conditions to be certain the process will work. Adjust parameters as necessary to make the experiment or investigation successful. When investigating with children, be certain to engage in multiple trials to demonstrate the importance of achieving accurate findings.

Support Independent Learning

When children acquire learning strategies that allow them to "fix up" when they encounter decoding or comprehension difficulties and make sense of the texts they are reading, they are more likely to engage in independent reading.

- Provide explicit instruction of useful strategies (e.g., inferring, questioning, summarizing, interpreting graphics and text features) with ample opportunities for demonstration, guided practice, and independent practice.
- Situate strategy instruction in the context of authentic, engaging, multimodal texts.
- Notice and name the learning strategies you observe children use so that they will recognize and intentionally use them during independent reading.
- Help children to read difficult or complex text by reading aloud, reading chorally, and reading with a partner before reading on their own.

Animal Adaptations

Big Ideas

- Animals developed different physical characteristics to help them meet their needs and survive.
- Some animals' physical characteristics allow them to meet their needs and survive by adapting to their surroundings and hiding from predators or prey.
- Humans can improve their performance and solve problems by mimicking the ways animals use their physical characteristics to meet their needs and survive.

Inspire Curiosity and Develop Understanding

- Develop curiosity about animals' adaptations through reading texts and viewing videos with teacher guidance.
- Develop ability to notice and explain differences in the animals' physical characteristics.

Deepen and Apply Understanding

- Gather more evidence through reading books, viewing videos, and playing educational games with peers.
- Increase understanding of the ways humans can mimic animals' physical features to solve problems by playing educational games.
- Create and share science reports using the PBS KIDS ScratchJr app.

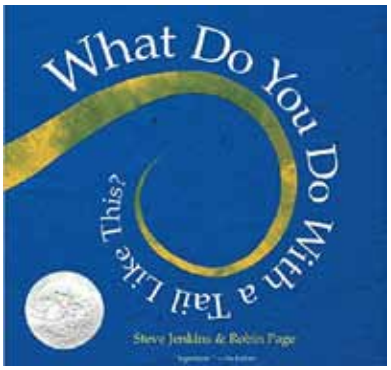
Develop Children's Ability to Think and Act as Scientists

- Conduct an experiment to answer an important question.
- Prompt children to share what they learned to make a difference.

MAKE SURE TO:

- prompt children to explain how a particular characteristic helps an animal meet its needs or survive in its habitat.
- prompt children to explain how mimicking a particular physical feature of an animal can help humans meet specific needs (e.g., mimic duck's webbed feet by wearing fins to swim faster).
- emphasize scientific practices such as observing, hypothesizing, analyzing, and explaining.

Preview



READ

What Do You Do with a Tail Like This?
by Steve Jenkins and Robin Page

How do different animals use the parts of their bodies? In this book, children will learn how an array of familiar and unfamiliar animals use their mouths, ears, noses, tails, eyes, and feet in many interesting ways. They will be challenged to match body parts to animals and guess how each part is used. Children will find additional information about each animal at the back of the book.

WATCH

Swimming with the Lobster (2:05)
to.pbs.org/2c4dFUL
NOTE: *If the link does not work, copy and paste (exactly, with no spaces) into your browser.*

In this short animated film clip, the Kratt brothers go under the ocean to explore the adaptations of the lobster. They observe how lobsters use their strong tail muscles to quickly swim backwards and how they use their mismatched front claws to eat and to defend themselves.

WRITE CODE

PBS KIDS ScratchJr (app)
pbskids.org/apps/pbs-kids-scratchjr.html#

Students will use the creative coding app, PBS KIDS ScratchJr, on tablets to report and share what they have learned about animal adaptations. With this simple programming tool, they will be able to create animated reports to express their understanding of important ideas. This work will extend over two days. On the first day, children will plan their coding, and on the second day, they will write the code.

The free PBS KIDS ScratchJr app is available for iPad® from Apple iTunes and for Android™ tablets from Google Play and Amazon. You will need to download it to each tablet. If you do not have a tablet for each child, children may work in pairs or groups.

To display the app so all students will be able to see your demonstration and also share their own work, you will need:

- A VGA connector (plugged into your tablet and a projector), *or*
- A document camera (such as an ELMO®). This is especially helpful because as you demonstrate, children will see both the screen and your interactions with the images on the screen.

Objectives

Lesson SEQUENCE

DAY 1 35 minutes

Unit Opening

Read and Record

Watch and Record

DAY 2 30 minutes

Get Ready to Gather More Evidence

Read, Review, and Record

DAY 3 20 minutes

Get Ready to Code Using a Think Sheet

DAY 4 35 minutes

Write Code using PBS KIDS ScratchJr

Review, Connect, Reflect

In this lesson, children will:

- Construct explanations (science practice).
- Engage in argument from evidence (science and engineering practice).
- Become curious about why animals have developed different physical characteristics.
- Make connections between an animal's physical characteristics and its survival strategies.
- Acquire and use vocabulary and concepts including **adaptation**, **habitat**, **observe**, **physical characteristics**, and **survival**.
- Read, respond to, and record information from books about physical characteristics of animals.
- View, respond to, and record information from videos about physical characteristics of animals.
- Use technology to learn, working individually and in groups.

Unit Opening

teacher PREP

DAY 1

1. Create the Animal Adaptations **Concept Map** (page 10) for display on an easel or bulletin board.
2. Display an image of a bird with prey, either the one on this page or a similar one that you find.
3. Borrow or purchase the book: *What Do You Do with a Tail Like This* by Steve Jenkins and Robin Page
4. Launch the video *Swimming with the Lobster* *. Press pause to keep the video from playing. Minimize it on the dock for easy access.

NOTE: *In the video, the narrator pronounces the word "pincer" as /pin cher/. The correct pronunciation is /pin-ser/.*

* to.pbs.org/2c4dFUL

Tell children that in this unit, they will learn about two big ideas in science: **adaptation** and **survival**.

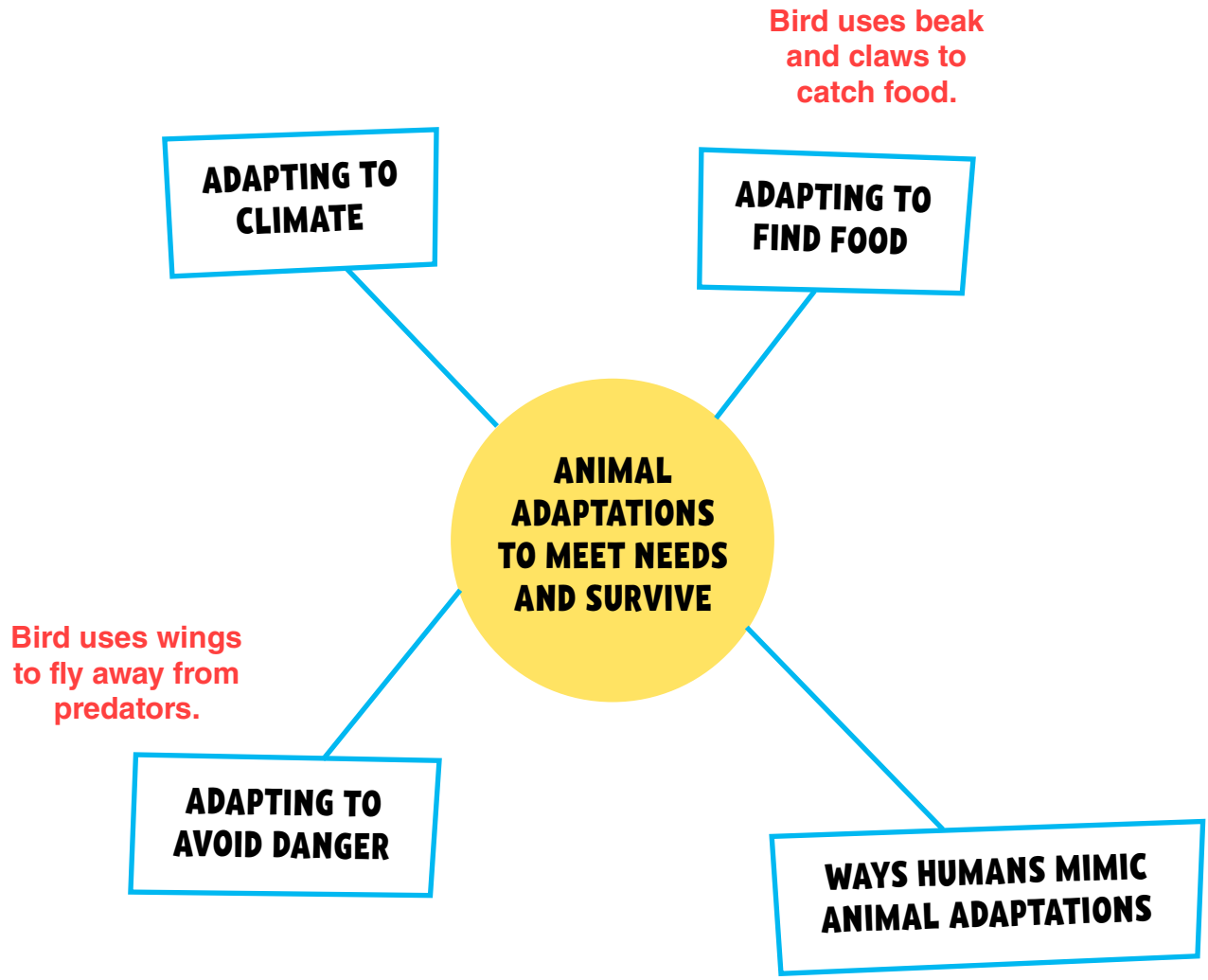
- Explain that adaptation is a process by which an animal develops features that help it stay healthy and alive, to **survive**, in its **habitat**.
- Explain that an animal's **habitat** is the place or surroundings where the animal lives.
- Point to each box on the **Concept Map** and explain that animals use their **physical characteristics** to stay healthy in different climates, to find food, to avoid danger, to solve problems, and to reproduce or create babies or young animals.

To help them think about animals' physical features, display the image of a bird with prey.

- Ask children to **observe** or notice the bird's **physical characteristics**—its beak, claws, wings, tails, eyes.
- Then ask:
  - **What words would you use to describe each these features or characteristics?**
  - **Why do you think this bird has these features or characteristics?**

As children respond, record their answers on the **Concept Map** connected to the appropriate box (e.g., **Birds use beaks to catch food**).

Concept Map


ANIMAL ADAPTATIONS TO MEET NEEDS AND SURVIVE
ADAPTING TO CLIMATE
ADAPTING TO FIND FOOD
Bird uses beak and claws to catch food.
ADAPTING TO AVOID DANGER
Bird uses wings to fly away from predators.
WAYS HUMANS MIMIC ANIMAL ADAPTATIONS

Read and Record

Inspire curiosity and help children develop the habit of noticing and explaining things in their world by reading aloud the first page of the book, *What Do You Do with a Tail Like This?* Then, as your read the next two pages, follow these steps.

FIRST

Model your thinking and reasoning:

- Choose one animal's nose and think aloud: e.g., **I think this is an alligator and I think its nose is way up at the top of its snout so that it can breathe and sniff while floating beneath the water without being seen. Then it can sneak up on and catch the creatures it wants to eat!**
- To demonstrate how to organize and recall important information, next to the "Adapting to Find Food" box on the **Concept Map**, write: **The alligator's nose is on top of its snout so it can stay hidden as it hunts for food.**

NEXT

Invite children to share their thinking and reasoning:

- Point to the elephant's nose and say: **This animal has a long nose called a trunk. What animal do you know has a trunk for a nose?** Call on a child to answer. Then tell the children to think about how an elephant might use its trunk to meet its needs, then share their thinking with a partner.
- Invite a few children to share their ideas.
- Repeat with one or two more animals. Then return to the text, and as you read each caption, point to the animal and comment on whether the children's ideas matched the author's. Prompt children to explain why the animals use their noses in certain ways. (e.g., **How does a mole's nose make it easier to dig underground?**)

Return to the **Concept Map** and guide children to add important ideas. (e.g., **An alligator uses its nose to breathe while hidden underwater looking for food.**) Be sure to display the pages for each of the animals (using a document camera if you have one) so that children can refer to them.

Repeat each of these steps with the page about feet (or any page you choose).

THEN

Tell the children that they will now watch a video about a lobster and how it uses two of its **physical characteristics**—the tail and the claws—to meet its needs.

Watch and Record

To develop their ability to use evidence to explain their thinking and construct arguments, tell the children that after they watch the video, you will ask them to describe how the lobster's tail and claws help it to meet its needs and **survive**.

DISPLAY THE VIDEO

After watching, have children turn and tell their partners why lobsters have big tails and different types of claws. To help them share and deepen their understanding, ask them to recall:

- how a lobster's tail helps it to meet its needs and **survive**. (It helps a lobster to quickly swim away backwards.)
- why it's helpful for lobsters to swim backwards.
- how a lobster's claws help it **survive** and meet its needs.
- why it's helpful to have one claw that crushes and one claw that cuts or shreds.

If you have time, watch the video again to reinforce understanding of how a lobster uses its physical features to meet its needs.

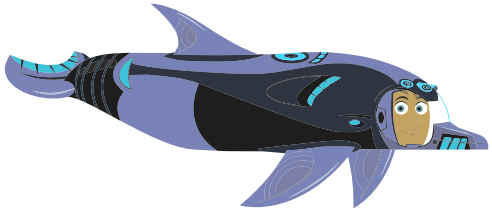
Close the video.

RECORD OBSERVATIONS

Tell the children that next they will record their observations on the **Concept Map** to help them recall and remember what they learned.

- Ask children to recall what they learned so far about how animals meet their needs and **survive**.
- As children respond, record their ideas.

Tell children that in the next part of the lesson, they will work together to gather more information about how animals use their **physical characteristics** to meet their needs and **survive**.



Get Ready to Gather More Evidence

teacher PREP

DAY 2

1 Borrow or purchase two or more of the following books for children to read individually or in small groups:
- *Who Has These Feet?* by Laura Hulbert
- *What Do You Do with a Tail Like This?* by Steve Jenkins and Robin Page
- *What Do You Do When Something Wants to Eat You?* by Steve Jenkins and Robin Page
- *Creature Features* by Steve Jenkins and Robin Page
- *Animal Defenses: How Animals Protect Themselves* by Etta Kaner

2 Launch one or more of the following videos for children to view individually or in small groups:
- *Swimming with the Lobster* to.pbs.org/2c4dFUL
- *Super Specialists* to.pbs.org/2ctOJI4
- *Creature Features* to.pbs.org/2bGWVlH
- *Chameleon Power!* to.pbs.org/2bFlPoG

3 On 4–6 sentence strips (one for each small group), write this question: **How do animals use their physical characteristics to meet their needs and survive?**

4 Gather enough sticky notes to distribute to children in each small group.

To help children recall what they learned in the previous lesson, return to the Animal Adaptations **Concept Map**.

Point to the center of the map, and remind the children that **adaptation** is a process through which animals develop features or **physical characteristics** to help them meet their needs and **survive**—to stay alive.

- Tell the children to recall at least one idea they learned about how animals use their **physical characteristics** to survive, and turn and tell a partner.
- Invite a few children to share their recollections, relating their ideas to the appropriate category on the **Concept Map**.

Point out that they have learned some important information about how animals **adapt** and develop **physical characteristics** to help them **survive**, but there is much more for them to learn!

Explain that when scientists are working to answer an important question, they gather as much evidence as they can so they can find the "right," or true, answers.

Tell them that next they will work with classmates to do what good scientists do—they will gather more evidence about how animals use their physical features to meet their needs and **survive** in their **habitat**.

Read, View, and Record

Create a learning center where children can gather evidence from books like these:

- *Who Has These Feet?* by Laura Hulbert
- *What Do You Do When Something Wants to Eat You?* by Steve Jenkins
- *Creature Features* by Steve Jenkins and Robin Page
- *Animal Defenses: How Animals Protect Themselves* by Etta Kaner

Create a learning center where children can gather evidence from videos like these:

- *Super Specialists* to.pbs.org/2ctOJI4
- *Creature Features* to.pbs.org/2bGWVIH
- *Chameleon Power!* to.pbs.org/2bFlPoG

Divide the children into small groups of 3 to 4 children. Assign half of the groups to a learning center with books and the other half to a learning center with videos.

Give each group a sentence strip with the question: **How do animals use their physical characteristics to meet their needs and survive?**

Give each group several sticky notes on which to record their evidence. Before each group begins, read the sentence aloud to support children who are not yet reading.

differentiated LEARNING

In this part of the lesson, you may assign children to groups based on their learning profiles.

As you place the children in groups, consider each child's strength. In each group, include at least one child who will successfully:

- read and comprehend words on the page.
- listen and comprehend information shared through a read aloud or in a video.
- notice small and large details in images.
- record the evidence in words or illustrations.
- organize the information by category.

Explain that as they read or view, they must look or listen for evidence to answer the question, and write the evidence they find on sticky notes. Tell them that when they finish the class will work together to place their sticky notes on the **Concept Map**.

RECORD OBSERVATIONS

Return to the **Concept Map** and ask a volunteer from each group to share their sticky notes. Together, decide where the information fits on the **Concept Map**.

Tell children that in the next part of the lesson, they will write about what they learned using tablets and PBS KIDS ScratchJr.

Introduce the Think Sheet

teacher PREP

DAY 3

1. Prepare enough copies of the **Lesson 1 Think Sheet** (pages 22–25) to provide one for each child.
2. Prepare the sentence frame (page18) to display as a model for the children to use as they write their own sentences.
3. Provide pencils for each child.

Explain that scientists often create a presentation or a report to share what they have learned so that others can also learn from their observations. Tell the children that in this lesson, like scientists, they will share what they have learned using an app called PBS KIDS ScratchJr.

- To help the children plan their writing, give each child the **Lesson 1 Think Sheet** and a pencil.
- Explain that good writers often begin by making a plan. They will use their **Think Sheet** to plan the information they want to share about what they have learned so far about animal adaptations.

*(On the next pages, you will guide the children through each step of the **Think Sheet**.)*

teacher NOTES

The lessons in this unit introduce children to a few basic features of PBS KIDS Scratch Jr. If your students have previously used this app, you may want to skip those sections of the **Think Sheet** instructions. There are some features that even children who have prior experience with the app may not know about, and they include:

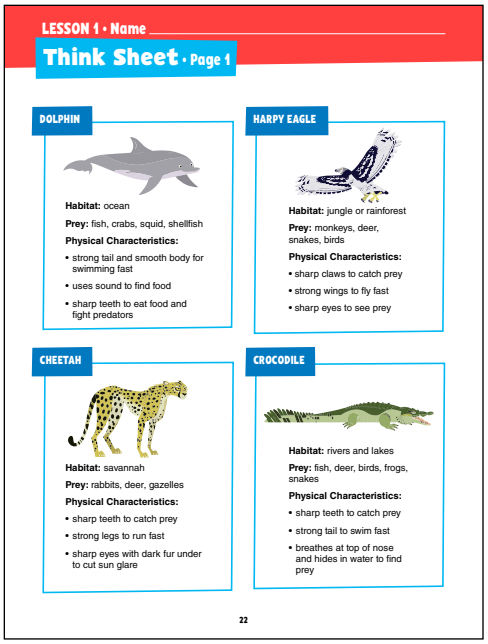
- The orange Speed block, used with the blue directional arrows, allows the user to set a character's speed to slow, medium, or fast.
- The pink Grow/Shrink blocks can help children establish their characters' sizes on the screen.
- The pink Hide/Show blocks can be used to make characters appear and disappear at the right moment.
- The pink Say block allows children to record a character's comments within speech bubbles (as an alternative to the sound recording).
- The orange Wait block (which looks like a clock) can be used to delay a character's movements. For example, a child might program a character to move right and then wait a few seconds before the next movement or sound. This block is especially helpful when children create interactions between two or more characters.

Think Sheet: Step 1

Distribute the Lesson 1 **Think Sheet** to each child. Using a document camera, if you have one, display the **Think Sheet** and take the children through it page by page.

Display the first page of the Think Sheet (page 22)

- Explain that first they must choose one of the four animals pictured to write about. To help them choose, briefly review the information about each animal, emphasizing the animal's name and **habitat**.
- Then, turn to the second page of the **Think Sheet** (page 23) and circle an animal and a habitat on your own **Think Sheet** and have children do the same. Remind them to choose the **habitat** where the animal really lives—this part of their writing must be true.


LESSON 1 • Name _____

Think Sheet • Page 1

DOLPHIN

Habitat: ocean

Prey: fish, crabs, squid, shellfish

Physical Characteristics:

- strong tail and smooth body for swimming fast
- uses sound to find food
- sharp teeth to eat food and fight predators

HARPY EAGLE

Habitat: jungle or rainforest

Prey: monkeys, deer, snakes, birds

Physical Characteristics:

- sharp claws to catch prey
- strong wings to fly fast
- sharp eyes to see prey

CHEETAH

Habitat: savannah

Prey: rabbits, deer, gazelles

Physical Characteristics:

- sharp teeth to catch prey
- strong legs to run fast
- sharp eyes with dark fur under to cut sun glare

CROCODILE

Habitat: rivers and lakes

Prey: fish, deer, birds, frogs, snakes

Physical Characteristics:

- sharp teeth to catch prey
- strong tail to swim fast
- breathes at top of nose and hides in water to find prey

22

teacher NOTES

1. If you do not have enough tablets to give one to each child, have children work with a partner. If you intend to have them create a collaborative report, have them share a **Think Sheet** so they can co-plan. Alternatively, if they will share a tablet but take turns writing individual reports, provide each child with his or her own **Think Sheet**.
2. If you don't print the **Think Sheet** in color, be prepared to show the children images or screen shots from the PBSKIDS ScratchJr app, so that as you introduce each feature they will associate it with an accurate image.

Think Sheet: Step 2

Display the third page of the Think Sheet (Page 24)

Explain that with PBS KIDS ScratchJr, they will use coding—computer rules or commands—to help share ideas in ways that we can't do on paper. For example, they can make characters move or they can record a sentence to describe what is happening.

FIRST

Point to the yellow blocks in box 3 and explain that, in computer coding, a block gives the computer a command—it tells the computer what to do. Explain that in PBS KIDS ScratchJr, yellow blocks tell the computer how to begin the first scene—the first part—of their report.

- Explain that they have two choices: The report can begin when they tap the green flag or when they tap an animal on the screen.
- Circle the block of your choice on your **Think Sheet** and have the children do the same on their own **Think Sheets.**

NEXT

Point to box 4. Explain that the blue blocks tell the computer the direction in which to move their animal.

- Pointing to each block, explain that they can use the blocks to write a code that tells the computer to move the animal to the right, left, up, down, or in a circle. They can even make an animal bounce or jump!
- Circle the blue block that you will use to animate your animal, and have the children do the same. As you do so, explain your thinking (e.g., I want my animal to move right, so I choose the blue block with the arrow that points to the right.)

THEN

Explain that they will use the keypad in box 5 to code how far they want their animals to move—just a little (one unit) or a lot (8 units)!

- As you make your choice, have the children do the same.

Think Sheet: Step 3

Display the fourth page of the Think Sheet (Page 25)

- Point to the green Microphone block in box 6 and explain that it tells the computer what sounds or words they want the character to say.
- Display the sentence frame below and explain to the children that they will use it to plan what they want their character to say. Remind them that their sentence must describe how their animal uses its body parts to meet its needs and survive.
- After you provide a model, have them complete the sentence frame on their **Think Sheet**.
  - Remind children that they can use the **Concept Map** to help them think of ideas to write about. They can also look back to the first page of their **Think Sheet** to find information about their animal.
  - Also tell children that if they finish and they'd like to write more, they may keep going.

The _____ _____
(animal's) (body part)

helps it to _____.

Write Code: Step 1

teacher PREP

DAY 4

1. Download the free PBS KIDS ScratchJr app on your tablet. Take some time to familiarize yourself with the basic coding commands and complete your own project so you can support your students with theirs.
2. Make sure you can display your tablet screen using a document camera (such as an ELMO®) or on a whiteboard with a VGA connector or a wireless connection.
3. Gather a class set of tablets (or a tablet for each pair of children) and make sure that each has PBS KIDS ScratchJr uploaded. Children will need to work on the same tablet every day so label each tablet with the name of the child or pair of children.

   If children are sharing a tablet, you may have them write a collaborative report. Provide guidance as they take turns during each part of their report writing, and especially when they use PBS Kids ScratchJr to write the code they have planned.

   Or you may have children write two separate reports, with each saved on the same tablet. If you choose this option, during the part of the lesson plan when children use PBS KIDS ScratchJr to write code, you will need to allocate twice as much time.

Have children seated at desks or tables so that they will be able to manage both their tablets and their **Think Sheets** as they write code. Give each child or pair of children the **Think Sheet** s/he prepared in the previous lesson. Also give a tablet to every child or to each pair of children.

Display your tablet, demonstrating each of the following steps and directing children to do the same on their tablets:

1. Tap the icon for the PBS KIDS ScratchJr app and then tap start.
2. Point out the icon for a new project and tap it.
3. The project page will open with a character, Dot, on the page. Delete Dot by touching and holding her until a pink x appears. Tap the pink x.

Create the report they planned

Using your **Think Sheet** as a guide, demonstrate how to code the first scene, pausing after each step and directing the children to complete the same steps.

- Point out the icon for choosing a character (left side). Tap it and scroll to find your animal. Tap the animal and then tap the green check mark. Have children do the same.
- Point out the icon for choosing a background (top of the screen). Scroll to find the background (or **habitat**) that goes with your character. Tap it and tap the green check mark. Have the children do the same.
- Remind children that even though you want them to use their **Think Sheet** as a guide, they could revise their plans as they write. “Real” authors do so all the time!

Write Code: Step 2

Animate your animal

- Point out that the animal you chose is shown in a rectangle on the left side of the screen. Tap it and point out that in the scene the animal is highlighted. Have the children complete this step.
- Next point out the blocks below the screen. Following your **Think Sheet** plan:
  - Tap the yellow block to see the commands for starting the animation of your animal. Make your choice and drag the block to start your code. Have children do the same.
  - Tap the blue block to see the commands for coding the direction in which your animal will move. Make your choice and drag the block to your code. Have the children do the same.
  - For each blue directional block, you must also choose how far the animal will move. Tap the number in the block and the number pad will appear. Select the distance your animal will move. As you do so, think aloud and explain your reasoning (e.g., **I know an eagle flies, so I am going to have my eagle fly up in the air and go to the right 8 spaces.**)

Add narration

Tap the green block and then tap the microphone surrounded by the dotted line.

- In the small recording screen, tap the red button.
- Record both of your sentences. When you are done, tap the white square.
- Tap the white triangle to check your recording. If you are satisfied, check the green button. If you'd like to record again, repeat these steps.
- Drag the green block and connect it to your code.

Check your coding

Start your report (by tapping either the flag or an animal) to see if it all works as you had planned!

Save your work

- Point out the ABC icon and have the children tap it. Have them write their name and a brief title for their report (e.g., "The Harpy Eagle"). Next, have them:
  - Tap the Home icon to save their work. Emphasize that if they do not tap the Home icon before they close the app, their work will not be saved.

Close and store the tablets.

Review, Connect, Reflect

REVIEW

To wrap up the lesson and support the children's independent learning, return to the **Concept Map** to review the key concepts.

- Ask the children to recall what they learned about how animals use their **physical characteristics** to meet their needs and **survive**.
- Ask the children to offer any new ideas and add them to the **Concept Map** connected to the appropriate box.

CONNECT TO HOME

- If children have worked individually, suggest they take home and share their **Think Sheets** with their family members.
- Distribute the **Family Letter** and say, **Tell a family member what you have learned so far about how animals use their physical characteristics to meet their needs and survive. Then choose one or more of the activities described in this letter to do together. As you play, view, or read together, talk about what you have learned about adaptation and survival!**

teacher REFLECTION

- Did most children identify and connect physical characteristics to animal survival strategies?

  If not, form a small group of children and read and discuss one of the recommended books or view and discuss one of the recommended videos.

- Were most children engaged with PBS KIDS ScratchJr and able to use it independently?

  If not, provide additional demonstration and guided practice to individuals or small groups before asking children to use it independently.

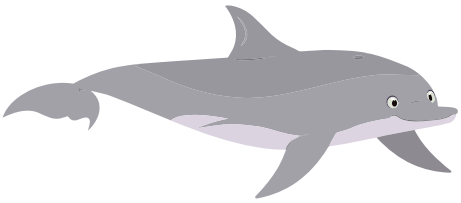
- Did most children use new vocabulary (adaptation, survival, physical characteristics, habitat, observe) during and after this activity?

  If not, review the words briefly and use them repeatedly as you continue to study the adaptation and survival of animals. Prompt children to use the words on their own.

Think Sheet • Page 1

Name _____

DOLPHIN



Habitat: ocean

Prey: fish, crabs, squid, shellfish

Physical Characteristics:

- strong tail and smooth body for swimming fast
- uses sound to find food
- sharp teeth to eat food and fight predators

HARPY EAGLE

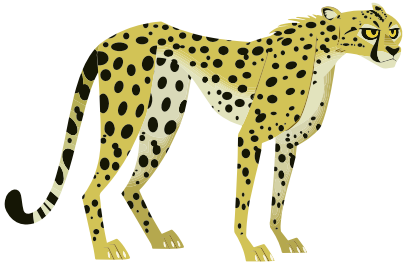
Habitat: jungle or rainforest

Prey: monkeys, deer, snakes, birds

Physical Characteristics:

- sharp claws to catch prey
- strong wings to fly fast
- sharp eyes to see prey

CHEETAH



Habitat: savannah

Prey: rabbits, deer, gazelles

Physical Characteristics:

- sharp teeth to catch prey
- strong legs to run fast
- sharp eyes with dark fur under to cut sun glare

CROCODILE

Habitat: rivers and lakes

Prey: fish, deer, birds, frogs, snakes

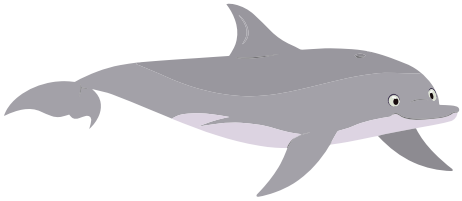
Physical Characteristics:

- sharp teeth to catch prey
- strong tail to swim fast
- breathes at top of nose and hides in water to find prey

Think Sheet • Page 2

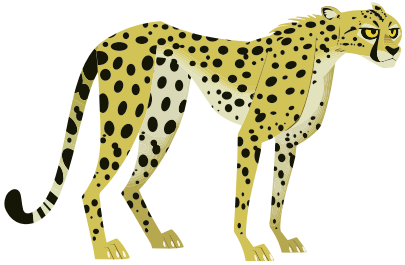
Name _____

1. WHICH ANIMAL WILL YOU WRITE ABOUT?



dolphin

harpy eagle



cheetah

crocodile

Check your animal bookmark to recall its habitat and physical characteristics.

2. WHAT HABITAT WILL YOU CHOOSE FOR YOUR ANIMAL?

riverbank

savannah

jungle

ocean

Think Sheet • Page 3

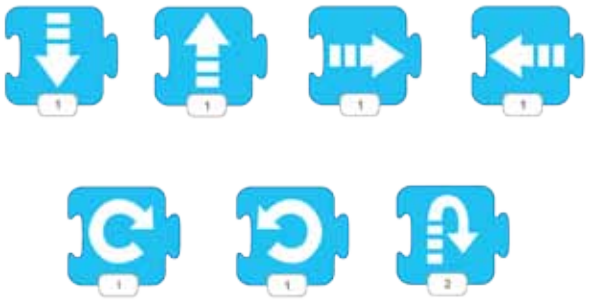
Name _____

3. CIRCLE THE BLOCK YOU WILL START WITH.

Touch flag

Touch animal

4. HOW WILL YOU ANIMATE YOUR ANIMAL?



5. HOW FAR WILL YOU MOVE YOUR ANIMAL?

Think Sheet • Page 4

Name _____

6. WRITE WHAT YOUR ANIMAL WILL SAY.

Tap microphone to record

LESSON 1

Family Letter

Dear Families:

In our classroom we are learning about animal **adaptations** with help from the PBS KIDS® series *Wild Kratts*. To begin our unit, we learned how animals have different **physical characteristics** that help them meet their needs and **survive**. For example, an elephant's trunk helps it eat food and take a bath to cool down. Here are some ways you can explore more about this topic at home with your child.

Talk Like a Scientist!

To help your child learn and use important words, use "science words" as you talk about and explore animal adaptations.

physical characteristic **adaptation** **survive** **observe** **habitat**

Explore at Home.

- While you are getting your child ready for school, observe together how your hands work to tie shoes or button shirts. Ask: **How do our hands help us survive?**
- Compare feet with your child and ask, **What are our feet adapted to do?**
- Anytime you are outside with your child, **observe** together how our eyes and ears help us to get around in the world safely.

Watch Together.

The Kratt brothers investigate **adaptations** of animals in these videos:

Caribbean Sea! to.pbs.org/2bVS3JJ

Nosing Around to.pbs.org/2bFnyKH

As you view with your child, ask question such as:

- **What physical characteristic is each animal using the most?**
- **What is the animal doing with that physical characteristic?**
- **How does that physical characteristic help the animal get food, hide, or survive (live) in that habitat?**

Read Together.

Visit your local library to check out books that will help your child think and talk about animal **adaptations**. Recommendations include:

- *Creature Features* by Steve Jenkins and Robin Page
- *Who Has These Feet?* by Laura Hulber

LESSON 1

Carta a las Familias

Estimadas familias:

En nuestro salón estamos aprendiendo acerca de **las adaptaciones** animales con la ayuda de la serie Wild Kratts de PBS KIDS®. Para comenzar nuestra unidad, aprendimos cómo los animales tienen diferentes **características físicas** que les ayudan a satisfacer sus necesidades y a **sobrevivir**. Por ejemplo, la trompa de un elefante le ayuda a comer alimentos y a darse un baño para refrescarse. He aquí algunas maneras de explorar junto con su hijo más acerca este tema en casa.

¡Habla como un científico!

Para ayudar a su niño a aprender y a utilizar palabras importantes, use "palabras de ciencias" mientras habla y explora las adaptaciones animales

característica física **adaptación** **sobrevivir** **observar** **hábitat**

Explorar en el hogar.

• Mientras está alistando a su niño para la escuela, póngalo a observar cómo sus manos trabajan para amarrarse los zapatos o abrocharse los botones de la camisa. Pregunte: ¿Cómo es que nuestras manos nos ayudan a **sobrevivir**?

• Comparen sus pies y los de su hijo y pregúntele: ¿Para qué están **adaptados** nuestros pies a hacer?

• En cualquier momento que salga con su hijo, **observen** juntos cómo nuestros ojos y oídos nos ayudan a movernos con seguridad en el mundo.

Ver juntos.

Los hermanos Kratt investigan **las adaptaciones** de los animales en estos videos:

Caribbean Sea! (Mar Caribe!) to.pbs.org/2bVS3JJ

Nosing Around (olfatea a tu alrededor) to.pbs.org/2bFnyKH

Conforme los ve con su hijo, haga preguntas como éstas:

• **¿Qué característica física está usando más cada animal?**

• **¿Qué está haciendo el animal con esa característica física?**

• **¿Cómo le ayuda al animal esa característica física para alimentarse, esconderse u ocultarse, o bien a sobrevivir (vivir) en ese hábitat ?**

Leer juntos.

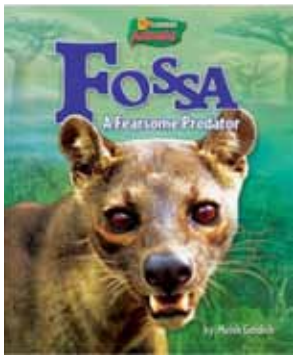
Visiten su biblioteca para sacar libros que le ayudarán a su hijo a pensar y a hablar acerca de las **adaptaciones** de los animales. Las recomendaciones incluyen:

• *Creature Features* por Steve Jenkins y Robin Page

• *Who Has These Feet?* por Laura Hulber

LESSON 2

Preview



READ

Fossa: A Fearsome Predator by Meish Goldish

Explore the world of the rare fossa on the island of Madagascar as it uses its strong, lean body to hunt its favorite food, lemurs, in the rainforest treetops.

WATCH

Fossa Hunting (1:39)
to.pbs.org/2cinRJL

In this short animated film clip, the Kratt brothers observe fossas in the jungles of Madagascar hunting lemurs. The fossa's powerful legs, lean agile body, and tail help it climb and leap among the trees chasing lemurs for food.

PLAY

Aviva's Powersuit Maker (challenge mode)
pbskids.org/wildkratts/games/power-suit-maker

Use the clues to identify animal parts that will make a complete powersuit for one of the Kratt brothers.

WRITE CODE

PBS KIDS ScratchJr (app) pbskids.org/apps/pbs-kids-scratchjr.html#

Students will use the creative coding app, PBS KIDS ScratchJr, on tablets to report and share what they have learned about animal adaptations to continue their science report started in Lesson 1. In this lesson, they will write about the ways humans mimic animals' physical characteristics to meet their needs and survive.

To display the app so all students will be able to see your demonstration and also share their own work, you will need:

- A VGA connector (plugged into your tablet and a projector), *or*
- A document camera (such as an ELMO®). This is especially helpful because as you demonstrate, children will see both the screen and your interactions with the images on the screen.

LESSON 2

Objectives

Lesson SEQUENCE

DAY 1 25 minutes

Read and Record

Watch and Record

DAY 2 25 minutes

Get Ready to Play

Play and Record

DAY 3 25 minutes

Get Ready to Code Using a Think Sheet

DAY 4 25 minutes

Write Code Using PBS KIDS ScratchJr

Review, Connect, Reflect

In this lesson, children will:

- Construct explanations (science practice).
- Engage in argument from evidence (science and engineering practice).
- Extend understanding about how animals have developed different physical characteristics that help them meet their needs and survive.
- Apply understanding by giving humans physical characteristics of various animals to improve human performance.
- Acquire and use vocabulary and concepts including **fossa, lemur, mimic, powerful, predator, prey.**
- Read, respond, and record information from books about how animals use their physical characteristics to meet their needs and survive.
- View, respond to, and record information from videos about how animals use their physical characteristics to meet their needs and survive.
- Use technology to learn, working individually and in groups.

Read and Record

teacher PREP

DAY 1

1. Display on an easel or bulletin board the Animal Adaptations **Concept Map** from the previous lesson.
2. Borrow or purchase the book, *Fossa: A Fearsome Predator* by Meish Goldish. **NOTE:** *"fossa" is pronounced "foosa."*
3. Launch the video *Fossa Hunting**.
4. Press pause to keep the video from playing. Minimize it on the dock for easy access.

* to.pbs.org/2cinRJL

Display and briefly review the **Concept Map**. Tell children they will continue to learn about how the physical characteristics of animals help them meet their needs and survive.

Call the children's attention to the cover page and title of the book, *Fossa:* (pronounced "foosa") *A Fearsome Predator.* Explain that a **predator** is an animal that hunts other animals, called their **prey**, for food; and that the words, fearsome **predator**, suggest that the **fossa** is very strong and **powerful**.

First, develop understanding of a fossa and how it acts as a predator.

- Display pages 14–15 (using a document camera if you have one). Tell the children that **fossas** are found in the forests of Madagascar. Prompt the children to look carefully at the illustration and to share:
  - what they notice about a **fossa's** physical characteristics (e.g., long legs, long tail)
  - how these physical characteristics might help **fossas** meet their needs and survive
- To focus the children's attention and support comprehension, explain that as you read they should listen for information about how the **fossa** looks and acts.
- After reading, keep the pages displayed for the children to see and tell them to:
  - Tell a partner what they noticed about how the physical characteristics of **fossas** help them meet their needs and survive in their habitat or environment.
  - After about 30 seconds, invite children to share their ideas. Record each on the **Concept Map**, connected to the appropriate category.

Next, display pages 4–5 and point out the lemur.

- Explain that **lemurs** are a **fossa's prey**—an animal fossas catch to eat. Guide children to notice the lemur's physical characteristics and to think how they might use these features to escape from **predators**.
- Then display pages 20–21. After reading the pages aloud, ask:
  - How do **fossas** try to catch **lemurs**?
  - How do **lemurs** try to stay safe from **fossas**?

Explain that next they will watch a video to learn more about how **fossas** use their physical characteristics to meet their needs and stay safe.

Watch and Record

DISPLAY THE VIDEO

Before pressing PLAY, tell the children that in the video, *Fossa Hunting*, a Kratt brother follows a **fossa** to figure out how it uses its physical characteristics to meet its needs and survive. Tell them that as they watch, they should study the **fossa** very carefully to see how it uses its physical characteristics to catch its **prey**. Press play to begin the video.

After watching the video, ask the children questions like these:

- **What does the fossa do to catch the lemur, its prey?**
- **How does a fossa's "super long tail" help it meet its needs and survive?**
- **Why do you think the Kratt brother is studying the fossa so carefully?**

Then close the video and tell the children that next they will recall and record their observations on the **Concept Map** to help them remember what they learned.

RECORD OBSERVATIONS

Call the children's attention to the **Concept Map**.

Ask children to recall what they learned about how animals use their physical characteristics to meet their needs and survive. As children respond, record their ideas.

Tell children that in the next part of the lesson they will play a game to help them understand how humans can **mimic** or copy animals so that they can improve their capacity to perform and solve problems.

Get Ready to Play

teacher PREP

DAY 2

1. Launch Aviva's Powersuit Maker* in the challenge mode.
2. Press pause to keep the game from playing. Minimize it on the dock for easy access.
3. When playing this game as a whole class, do *not* provide children with individual tablets because the game starts at different points when it is opened on different devices.
4. Sometimes the game repeats the same animal's powersuit a second time. If this happens, restart the game.

To help children recall what they have learned, display the **Concept Map**. Pointing to each box, ask children to recall important ideas from the previous lesson. (Keep the **Concept Map** in view, because you will return to it as children play the game.)

Explain that in the game, Aviva's Powersuit Maker, they will help the Kratt brothers build a suit that **mimics** or copies animal characteristics to help them perform important tasks or solve important problems.

Describe the purpose of the game.

Tell children that Aviva needs help making powersuits for the Kratt brothers. She will explain what the Kratt brothers need to be able to do and they must help her choose the animal body part that is the best solution.

Connect the game to the previous lesson.

Explain that, like in the book, *What Do You Do with a Tail Like This?*, they will be shown the same body part from several animals and they will decide which one best meets the needs of the Kratt brothers.

Review the technology features of the game.

Display the game Aviva's Powersuit Maker and choose challenge mode. Have children listen to Aviva's introduction.

Point out the animal body parts they are to choose from and demonstrate how to drag the body part to the corresponding body part on the Kratt brother. Point out that:

- The body part resets if it is dragged to the incorrect body part on the brother.
- If the wrong animal's body part is selected and dragged, it disappears and the child is told to try again.
- If the child makes five incorrect choices, the game will reset.

After dropping the body part onto the powersuit, ask the children to repeat Aviva's explanation for why it is a helpful feature.

Tell the children that when they play on their own, it is important to listen and pay special attention to Aviva's explanation so that they learn as much as they can about how humans can copy the physical characteristics of animals.

* pbskids.org/wildkratts/games/power-suit-maker/

Play and Record

As you begin to play the game together, prompt children to listen to Aviva's description of the animal characteristic the Kratt brother needs and why he needs it. Then call on a child to repeat the description. If no one is able to recall Aviva's description, point out the text below Aviva and read it aloud. Next, follow these steps:

- Tell children to look carefully at the body parts of each animal and tell a partner which one will help make the Kratt brother's powersuit do what he needs. Remind children to explain their reasoning: **Remember to say why the physical characteristic of this animal would be helpful.**
- After about 30 seconds, call on a few children to share their choices and explain their reasoning. (Make sure that the reasoning describes how the physical feature meets Aviva's description of what is needed.)
- Then ask one of the children to come to the interactive whiteboard to drag and drop the animal part.
  - If the answer is correct, Aviva will explain why. After listening, have one child explain how the body part will help the Kratt brother and then move on to the next piece of the powersuit.
  - If the answer is incorrect, explain why. For example, **Aviva said we need a powersuit that will have a stinky defense. I guess that one doesn't have that characteristic.** Then ask the child to try again or call on another child to drag and drop his/her choice. Repeat until the correct animal body part is selected.
- After each powersuit is completed, the children will see an image of the Kratt brother in the powersuit and some Creature Facts. Mute the sound and ask the children to recall what they learned about the ways animals use their physical characteristics to help them meet their needs and survive.

Continue playing, repeating each of these steps, until most of the children choose the body part with the correct physical characteristics and express relatively sound scientific reasoning.

RECORD OBSERVATIONS

Return to the **Concept Map** and point to the box labeled, "Ways Humans Mimic Animal Adaptations."

- Ask the children to recall what they learned about how humans can copy or mimic physical characteristics of animals to solve problems. Then tell them to tell a partner one idea they remember.
- Invite a few children to share their ideas, providing prompts or guidance as necessary. Record the information on the **Concept Map**.

Tell the children that in the next part of the lesson, they will again write about what they have learned using tablets and the PBS KIDS ScratchJr app.

Think Sheet: Step 1

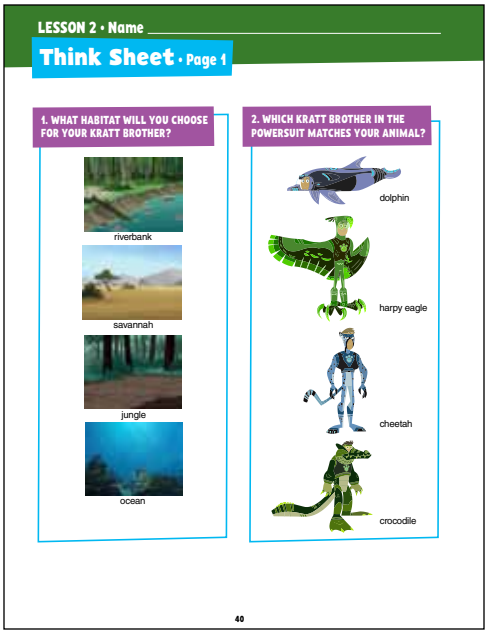
teacher PREP

DAY 3

1. Prepare enough copies of the Lesson 2 **Think Sheet** (pages 40–43) to provide one for each child.
2. Provide pencils for each child.
3. Prepare the sentence frame on page 35 for display.

Explain to children that they will continue to work on their science report. In today's writing, they will include information about how humans **mimic** or copy the physical characteristics of animals so that they can improve their problem solving and performance.

Give each child a pencil and the Lesson 2 **Think Sheet**. (Review the instructions on page 16 if pairs of children are working together.)


LESSON 2 • Name _____

Think Sheet • Page 1

1. WHAT HABITAT WILL YOU CHOOSE FOR YOUR KRATT BROTHER?

riverbank

savannah

jungle

ocean

2. WHICH KRATT BROTHER IN THE POWERSUIT MATCHES YOUR ANIMAL?

dolphin

harpy eagle

cheetah

crocodile

40

Display the first page of the Think Sheet

NOTE: *If the **Think Sheet** is in black and white, show images or screen shots from PBS KIDS ScratchJr as you talk about its features so children can see the colors of different types of blocks.*

- Point to box 1 on your **Think Sheet** and review the habitats introduced in Lesson 1 (riverbank, savannah, jungle, ocean). Say that you are going to choose the same habitat as in Lesson 1 so that each part of the report connects to the earlier part. Circle the habitat on your **Think Sheet** and have children do the same.
- Next point to box 2. Point out the Kratt brother in each powersuit and explain that they must choose the one that matches the animal they wrote about in the first scene of their science report. Circle the Kratt brother that matches your animal and have children do the same.

Display the second and third pages of the Think Sheet

- On page 2, children will make the same choices they made when planning their first scene. Remind them of the steps, make and explain your choices, and have children make their own.
- On page 3, explain that in this scene, they may move their character more than once. Demonstrate and explain your thinking and guide children to make their own choices.

Think Sheet: Step 2

Display the fourth page of the Think Sheet

Call children's attention to the sentence frame. Tell children that as they did in the previous lesson, they will use the sentence frame to plan what they want their character to say.

I use the _____ _____
(animal's) *(body part)*

to _____

After you provide a model, have children write the sentence they would like the Kratt brother to say.

Remind children that they can use the **Concept Map** to help them think of things to write about. Also tell children that if they finish and they would like to write more, they may keep going.

Collect children's **Think Sheets** and tell them that in the next part of the lesson, they will use their **Think Sheet** to write code using PBS KIDS ScratchJr.

Write Code: Step 1

teacher PREP

DAY 1

1. Open the PBS KIDS ScratchJr app on your tablet. Take some time to familiarize yourself with the basic coding commands you will use in today's lesson so you can support your students as they write code.
2. Make sure you can display your tablet screen using a document camera (such as an ELMO®) or on a whiteboard with a VGA connector or a wireless connection.
3. Gather the tablets used in the previous lesson and distribute to children.

   If children are sharing a tablet and writing a collaborative report, provide guidance as they take turns during each part of their report writing, especially when they use PBS KIDS ScratchJr to write the code they have planned.

   If they are writing separate reports, be sure to allocate twice as much time.

Have children seated at desks or tables so that they will be able to manage both their tablets and their **Think Sheets** as they prepare their science reports. Give each child or pair of children the **Think Sheet** s/he prepared in the previous lesson. Also give a tablet to every child or to each pair of children.

Display your tablet, demonstrating each of the following steps and directing children to do the same on their tablets.

1. Tap the icon for the PBS KIDS ScratchJr app and then tap Start.
2. Locate your project from Lesson 1 and tap it.
3. Choose a new scene (tap the plus sign on the right side of the screen). Choose the background icon at the top of the screen and scroll to find the scene they chose on page 1 of their **Think Sheet**.
4. Delete Dot by touching and holding until a pink x appears. Tap the pink x.
5. Choose your character from page 1 of your **Think Sheet**. To do so, tap the plus sign to the left of the scene. Find and tap your character. Tap the green check mark.

To connect Scene 2 to Scene 1, demonstrate these steps and have the children follow along with you:

1. Tap your Scene 1 to bring it up on the screen.
2. Then tap the Red Block and point out the new scene as a tiny red block.
3. Drag that block to the end of your narrator's code for Scene 1. (This makes the project advance to the next scene when the code is finished.)

Write Code: Step 2

REVIEW

- how to return an object to where it started (the blue button to the right of the green flag)
- how to correct a mistake in the code (starting with the last box, separate the code boxes one at a time; touch the block you want to change and swipe it up and out of the coding space)

Create Scene 2

Using pages 2–4 of your **Think Sheet** as a guide, demonstrate how to code the second scene. Once again, complete one step at a time, pausing each time to allow children to follow your example. As you do so, observe and provide guidance as necessary. See page 20 to review coding instructions.

- With each decision, remind children that the science report must demonstrate what they have learned about how humans can **mimic** animal adaptations. Remind children that even though you want them to use the **Think Sheet** as a guide, they could revise their plans as they write. "Real" authors do so all the time!
- To check their coding, have the children start their report by tapping the flag or a character to see if it works as planned.
- After children complete their second scene, remind them to tap the Home button at the top left to save their work.
- Close and store the tablets.

Review, Connect, Reflect

REVIEW

To wrap up the lesson and support children's independent learning, return to the **Concept Map** to review key concepts.

- Ask the children to recall what they learned about the ways humans **mimic** the physical characteristics of animals to help them improve their performance capabilities and solve problems. If children offer new ideas, add them to the **Concept Map** connected to the appropriate box.

CONNECT TO HOME

- Suggest that children take home and share their **Think Sheets** with their family members.
- Distribute the **Family Letter** and say **Tell a family member what you have learned so far about the ways humans mimic the physical characteristics of animals to help them improve their performance and solve problems. Then choose one or more of the activities described in this letter to do together. As you play, view, or read together, talk about what you have learned about the ways animals and humans adapt to meet their needs and survive.**

teacher REFLECTION

- Did most children identify and connect animals' physical characteristics to the ways humans design solutions and figure out ways to improve performance?

  If not, form a small group of children who need extra help and play Aviva's Powersuit Maker or read related books.

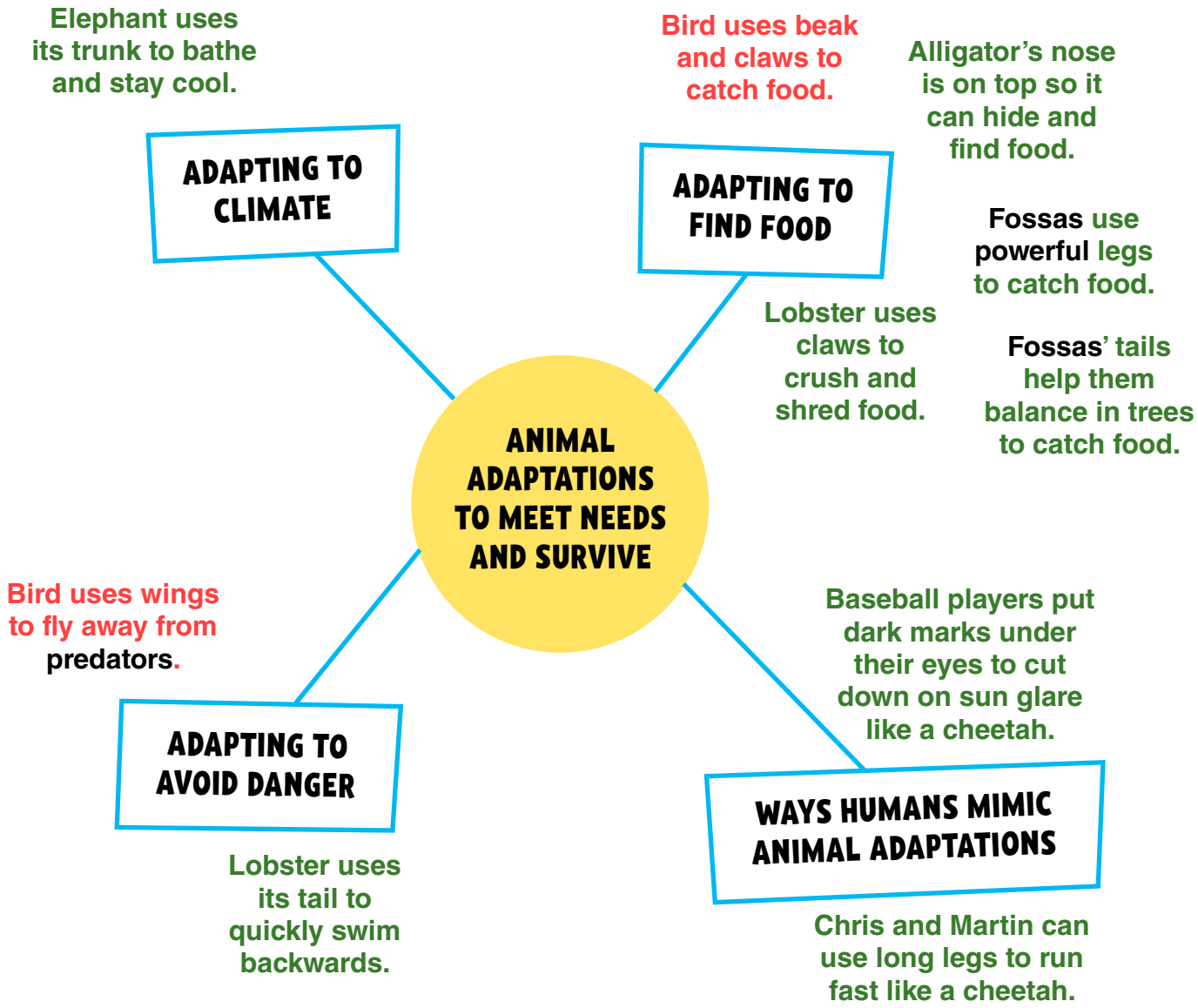
- Were most children engaged with PBS KIDS ScratchJr and able to use it independently?

  If not, provide additional demonstration and guided practice to individuals or small groups before asking children to use it independently.

- Did most children use new vocabulary (**mimic**, **powerful**, **predator**, **prey**) during and after this activity?

  If not, review the words briefly and use them repeatedly as you continue to study animals' adaptation and survival. Prompt children to use the words on their own.

Concept Map


ANIMAL ADAPTATIONS TO MEET NEEDS AND SURVIVE
ADAPTING TO CLIMATE
Elephant uses its trunk to bathe and stay cool.
ADAPTING TO FIND FOOD
Bird uses beak and claws to catch food.
Alligator's nose is on top so it can hide and find food.
Fossas use powerful legs to catch food.
Fossas' tails help them balance in trees to catch food.
Lobster uses claws to crush and shred food.
ADAPTING TO AVOID DANGER
Bird uses wings to fly away from predators.
Lobster uses its tail to quickly swim backwards.
WAYS HUMANS MIMIC ANIMAL ADAPTATIONS
Baseball players put dark marks under their eyes to cut down on sun glare like a cheetah.
Chris and Martin can use long legs to run fast like a cheetah.

LESSON 2

Think Sheet • Page 1

Name _____

1. WHAT HABITAT WILL YOU CHOOSE FOR YOUR KRATT BROTHER?

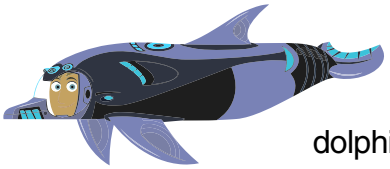
riverbank

savannah

jungle

ocean

2. WHICH KRATT BROTHER IN THE POWERSUIT MATCHES YOUR ANIMAL?



dolphin

harpy eagle

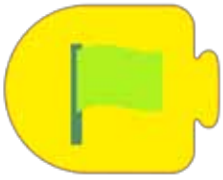
cheetah

crocodile

Think Sheet • Page 2

Name _____

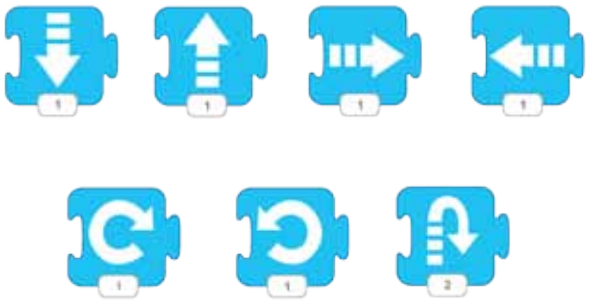
3. HOW WILL YOU START THE ANIMATION OF YOUR KRATT BROTHER?



touch flag

touch Kratt brother

4. HOW WILL YOU MOVE YOUR KRATT BROTHER?



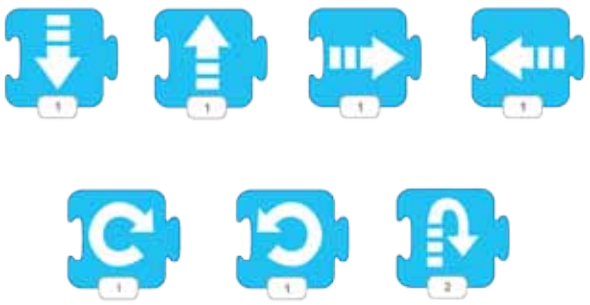
5. HOW FAR WILL YOU MOVE YOUR KRATT BROTHER?

LESSON 2

Think Sheet • Page 3

Name _____

6. HOW WILL YOU ANIMATE YOUR KRATT BROTHER AGAIN?



7. HOW FAR WILL YOU MOVE YOUR KRATT BROTHER?

Think Sheet • Page 4

Name _____

8. WHAT WILL YOUR KRATT BROTHER SAY?

Tap microphone to record

LESSON 2

Family Letter

Dear Families:

In our classroom we are continuing to learn about animal adaptations with help from the PBS KIDS® series *Wild Kratts*. This week we learned how humans can design solutions to problems by mimicking how animals use their physical characteristics to survive and meet their needs. Here are some ways you can explore more about this topic at home with your child.

Talk Like a Scientist!

To help your child learn and use important vocabulary, use these words as you talk about and explore animal adaptations.

predator **prey** **powerful** **mimic**

Explore at Home.

As children are getting dressed to go outside, connect outdoor clothing to animals. Ask questions like these:

- **How do animals give us ideas about staying warm when it's cold?** *(People put on warm fuzzy or furry coats to stay warm.)*
- **How do animals give us ideas for staying dry on a rainy day?** *(We wear slippery clothing that makes rain run off like a duck's feathers do.)*
- **How do people use the idea of a turtle's hard shell to keep safe?** *(We put on gear with a hard shell to protect us, such as a helmet on our head or shin guards on our legs.)*

Watch Together.

The Kratt brothers explore how people mimic snakes in this video clip.

- *Snake Super Sense* to.pbs.org/2c7Vg7X

Play Together.

Aviva's Powersuit Maker pbskids.org/wildkratts/games/power-suit-maker/

As you play with your child, ask questions like these:

- **Why did you choose that body part for the powersuit?**
- **What can the Kratt brother do with that animal power?**
- **How does that physical characteristic help the animal get food, hide from predators or prey, or survive?**

Read Together

Look for books like these at your local library to help your child think and talk about animal adaptations:

- *What Do You Do When Something Wants to Eat You?* by Steve Jenkins and Robin Page
- *Have You Ever Seen a Duck in a Raincoat?* by Etta Kaner

LESSON 2

Carta a las Familias

Estimadas familias:

En nuestro salón de clases seguimos aprendiendo acerca de las adaptaciones animales con la ayuda de la serie *Wild Kratts* de PBS KIDS®. Esta semana nos enteramos de cómo los seres humanos pueden diseñar soluciones para resolver problemas imitando la manera como los animales usan sus características físicas para sobrevivir y satisfacer sus necesidades. He aquí algunas maneras como usted puede hablar y explorar más acerca de este tema en casa junto con su hijo.

¡Habla como un científico!

Para ayudar a su niño a aprender y a utilizar vocabulario importante, use estas palabras al hablar y explorar las adaptaciones animales.

depredador **presa** **poderoso(a)** **imitar**

Explorar en el hogar.

Mientras los niños se visten para salir a la calle, establezca la relación entre la ropa del exterior y los animales. Haga preguntas como éstas:

- **¿Cómo los animales nos dan ideas para mantenernos calientes cuando hace frío?** *(La gente se pone abrigos peludos o de piel para mantener el calor.)*
- **¿Cómo los animales nos dan ideas para permanecer secos en un día de lluvia?** *(Usamos ropa de textura resbaladiza que hace que la lluvia escurra, al igual que las plumas de un pato.*)

Ver juntos.

Los hermanos Kratt explorarán cómo las personas imitan a las serpientes en este videoclip.

- *Snake Super Sense* to.pbs.org/2c7Vg7X

Jugar juntos.

Aviva's Powersuit Maker pbskids.org/wildkratts/games/power-suit-maker/

Mientras juega con su hijo, haga preguntas como éstas:

- **¿Por qué escogiste esa parte del cuerpo para usar el traje con poderes?**
- **¿Qué puede hacer el hermano Kratt con ese poder animal?**

Leer juntos.

Busquen libros como estos en su biblioteca local para ayudar a que su niño piense y hable de las adaptaciones animales:

- *What Do You Do When Something Wants to Eat You?* by Steve Jenkins and Robin Page
- *Have You Ever Seen a Duck in a Raincoat?* by Etta Kaner

LESSON 3

Preview

READ

I See a Kookaburra! by Steve Jenkins and Robin Page

From deserts to oceans, animals live in different habitats all over the world. As they read this book together, children will observe how these animals use their adaptations to survive and thrive in different ways.

WATCH

Wintertime Creature Powers (1:40)
to.pbs.org/2c4kwOe

The Kratt brothers observe how some animals stay active outside all winter long. This is because their bodies are adapted to staying warm and finding food, even in the snow.

PLAY

Aviva's Powersuit Maker (experiment mode)
pbskids.org/wildkratts/games/power-suit-maker/

In the experiment mode, children consider how different animal characteristics give humans "creature powers." In this mode, children get to choose their own animal parts to create a powersuit, unlike in challenge mode in which they could only choose the animal part that Aviva described. To support children's understanding of how humans can mimic animals' adaptations to improve their performance, be sure to ask children to explain the reasoning they used to choose each animal part.

WRITE CODE

PBS KIDS ScratchJr (app) pbskids.org/apps/pbs-kids-scratchjr.html

Students will use the creative coding app, PBS KIDS ScratchJr, on tablets to complete the science report they worked on in Lessons 1 and 2. In this lesson, they will add a third scene to demonstrate their understanding of how animals try to catch their prey and escape their predators. They will also share their reports through various forms of social media.

To display the app so that all students will be able to see your demonstration and also share their own work, you will need:

- A VGA connector (plugged into your tablet and a projector), *or*
- A document camera (such as an ELMO®). This is especially helpful because as you demonstrate, children will see both the screen and your interactions with the images on the screen.

Objectives

Lesson SEQUENCE

DAY 1 30 minutes

Read and Record

Watch and Record

DAY 2 25 minutes

Get Ready to Play

Play and Record

DAY 3 30 minutes

Get Ready to Code Using a Think Sheet

DAY 4 40 minutes

Write Code Using PBS KIDS ScratchJr

Publish

Review, Connect, Reflect

In this lesson, children will:

- Ask questions (science practice).
- Construct explanations (science practice) and design solutions (engineering practice).
- Engage in argument from evidence (science and engineering practice).
- Develop understanding of how animals have adapted to survive in cold climates.
- Apply understanding by helping humans adapt to different conditions by mimicking the physical characteristics of animals.
- Acquire and use vocabulary and concepts including **camouflage**.
- Read, respond to, and record information from books about how animals' physical characteristics help them adapt to their surroundings.
- View, respond to, and record information from videos about how animals' physical characteristics help them adapt to their surroundings.
- Use technology to learn, working individually and in groups.

Read and Record

teacher PREP

DAY 1

1. Display the **Concept Map** from the previous lesson on an easel or bulletin board.
2. Borrow or purchase the book, *I See a Kookaburra!: Discovering Animal Habitats Around the World* by Steve Jenkins and Robin Page
3. Launch the video, *Wintertime Creature Powers** Press pause to keep the video from playing. Minimize it on the dock for easy access.
4. Borrow or purchase two or more of these books and place in the book center for children's use during independent reading time.
   - *I See a Kookaburra!: Discovering Animal Habitats Around the World* by Steve Jenkins and Robin Page
   - *Nothing Like a Puffin* by Sue Soltis
   - *Hop* by Jorey Hurley
   - *Who Can Live in the Mountains?* by Sheila Anderson
   - *Who Can Live in the Forest?* by Sheila Anderson

* to.pbs.org/2c4kwOe

Display and briefly review the **Concept Map**. Explain that in this lesson, children will learn about different ways animals adapt to their habitat (their surroundings) so they can meet their needs and survive.

To continue to develop children's ability to observe and explain things in the world, display the cover page from *I See a Kookaburra!* (using a document camera if possible).

- Point to the kookaburra and explain that it is a bird that lives in the forests of Australia.
- Tell children to study the illustration and tell their partner something they notice about the animal (the bird) and its habitat (the bird's surroundings).
- Invite a few children to share. As children observe and notice, emphasize the similarity in the coloring of the bird and the leafy grass. Explain that when animals hide by blending into their habitat or environment, they use **camouflage**, an adaptation that helps them hide. Being able to hide helps them in two ways: They can escape from their predators so they are not eaten, and they can sneak up on their prey so that they can capture food to eat!

As you display the next two pages:

- Model your observations and your thinking. (e.g., **I notice a rattlesnake hiding behind rocks—its color is the same as the rocks so it is camouflaged—it's hidden so well I bet a predator like a hawk wouldn't even see it.**)
- Explain that **camouflage** is only one way that animals adapt to their surroundings. Tell children that as you read together, they should look for other ways animals adapt to their habitat.
- As you continue to read, ask:
  - **What do you notice or observe about the animals and their habitat?**
  - **Do you think the animal is hiding from a predator or a prey? What makes you think that?**
- After a few children share, read the captions and ask the children if their ideas are the same as those of the author.

Repeat these steps as you continue to read a few more pages.

Record Observations

When most of the children are able to notice and explain how animals adapt to their surroundings, stop reading and return to the **Concept Map**. Guide children to recall important ideas about how animals adapt to their habitat, and add the ideas to appropriate categories on the **Concept Map**. Keep the pages of the book displayed and remind children that they can refer to the book to help recall ideas.

Tell children that next they will watch a video about animals' adaptations to cold climates.

Watch and Record

Display the video, *Wintertime Creature Powers*. To support children's attention and understanding, tell them that as they watch, they should notice and listen for ways some animals have adapted physical characteristics that help them to meet their needs and survive in cold climates. Say that after viewing, you will ask them to share what they noticed and heard. Play the video.

After watching the video, provide an example of an important observation.

- Have children tell their partners the adaptations they noticed and why these adaptations help the animal survive and meet its needs in the cold and snow.
- Invite a few children to share their responses. As children respond, prompt them to explain why the adaptation helps the animal survive.
- Add each response to the appropriate box on the **Concept Map**.

Tell children that in the next part of this lesson, they will play a game to learn more about how humans use what they notice about animal adaptations to improve their own performance and solve problems.

Get Ready to Play

teacher PREP

DAY 2

1. Launch Aviva's Powersuit Maker* in the experiment mode.
2. Press pause to keep the game from playing. Minimize it on the dock for easy access.
3. When playing this game as a whole class, do *not* provide children with individual tablets because the game starts at different points when it is opened on different devices.

To help children apply understanding of how humans can adapt to different surroundings by mimicking the physical characteristics of animals, guide them as they play Aviva's Powersuit Maker in experiment mode.

Describe the purpose of the game.

Tell children that they will help Aviva make powersuits for the Kratt brothers again. However, this time they will choose which animal body part to include in the powersuit, describe why they chose it, and tell how it will help the Kratt brothers adapt to an environment or solve a problem to meet their needs.

Connect the game to the previous lesson.

Explain that, like the animals in the video *Wintertime Creature Powers*, humans often need to adapt to different climates and conditions to meet their needs. Humans can mimic the physical characteristics of animals to help adapt and survive.

Display the game, Aviva's Powersuit Maker and choose experiment mode.

- Have children listen to Aviva's introduction.
- Point out the animal parts they may choose from. Remind children that the previous time they played this game, Aviva told them what the powersuit needed to be able to do. This time, they will make their own decisions. They will:
  - Choose any of the animal body parts.
  - Explain how it will help the Kratt brother adapt to a climate or solve a problem.
- Demonstrate how to drag the body part to the Kratt brother and model your reasoning.
- Point out the "shuffle" icon and explain that to see additional animal parts, they can tap this icon.
- Tell children that they should listen carefully to Aviva's explanation to learn more about how humans can solve problems by mimicking the adaptations of animals.

  NOTE: *Let children know that Aviva's explanation happens very quickly. They must be alert and listen carefully so that they do not miss it.*

* pbskids.org/wildkratts/games/power-suit-maker/

Play and Record

As you play the game together, follow these steps to help children deepen their understanding of the ways animals use their physical features to meet their needs and survive and the ways humans can learn from and mimic animals to meet their own needs.

- Point to two or three of the body parts and invite children to describe the physical characteristics of each (e.g., the cheetah's legs are long and thin with spots on them. The rhino's legs are very wide at the top and stubby at the bottom.)
- Explain that as they play the game they should notice the characteristics of each body part and think about how it will help the Kratt brother adapt to particular surroundings or solve a problem.
- Tell children to examine all of the choices and tell their partner the body part they would choose and why. Remind them to explain how the body part will help the Kratt brother adapt to particular surroundings or solve a problem.
- Invite a few children to share their choices and their thinking. (As children share, guide them to maintain a quick pace so that you maintain the engagement of all children.) Then have one child come to the whiteboard to drag and drop the body part on to the Kratt brother.
- After children listen to Aviva's explanation, ask them to explain how Aviva's thinking was the same or different from their own or the thinking of a classmate (e.g., Aviva said that a cheetah's legs are long and powerful to help it run fast. This is like what Oliver said—he chose it because he wanted the Kratt brother to run fast and far).

Continue playing, repeating each of these steps, until most of the children are able to express relatively sound scientific reasoning about why they chose each animal body part. As you end the game, tell children to recall what they learned about the ways humans can mimic physical features of animals to help humans perform important tasks or solve problems.

RECORD OBSERVATIONS

Return to the **Concept Map** and point to the box labeled "Ways Humans Mimic Animal Adaptations."

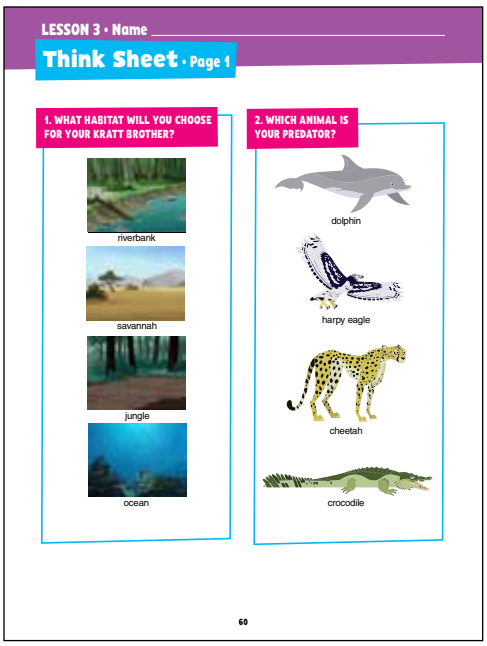
- Ask children to share the new ideas they learned during game play about how humans can copy or mimic the physical characteristics of animals to solve problems.
- Invite a few children to share their ideas, providing prompts or guidance as necessary. Record the information on the **Concept Map**.

Tell children that in the next part of the lesson, they will again write about what they have learned using tablets and the PBS KIDS ScratchJr app.

Think Sheet: Step 1

DAY 3 teacher PREP

1. Prepare enough copies of the Lesson 3 **Think Sheet** (pages 60–65) to provide one for each child.
2. Provide pencils for each child.
3. Prepare the sentence frame on page 54 to display as a model for the children to use as they write their own sentences.



Explain to the children that they will continue to work on their science reports on animal adaptations. In today's writing, they will describe and demonstrate how a predator tries to catch prey and how a prey tries to escape!

- Give each child a pencil and the PBS KIDS ScratchJr **Think Sheet**. (Review tthe instructions on page 16 if children are working together.)

Display the first page of the Think Sheet

NOTE: *If the **Think Sheet** is in black and white, show images or screen shots from PBS KIDS ScratchJr as you talk about its features so children can see the colors of different types of blocks.*

- Point to box 1 on your **Think Sheet** and review the habitats (riverbank, savannah, jungle, ocean). Say that you are going to choose the same habitat as in Lessons 1 and 2 so that each part of the report connects to the earlier part. Circle the habitat on your **Think Sheet** and have children do the same.
- Next point to box 2. Circle the animal (a predator) you chose in Lesson 1 and have children do the same.

Display the second page of the Think Sheet

- Remind children that they must tell the computer how they will start their character's animation. Make your choice and have children make theirs.
- Point to boxes 4 and 5 and explain that in this scene they will show how their predator tries to catch and eat its prey. Think aloud as you imagine how you will make your animal move, mentioning how its physical characteristics help it move and meet its needs. Then guide children to make their choices about how their predator will move and how far.

Think Sheet: Step 2

Display the third page of the Think Sheet

Explain that next they must choose the animal or prey that the predator will hunt. Tell children to turn to the last page of their **Think Sheet.** Think aloud as you decide which animal to choose as prey. Guide children to do the same and circle the choice in box 6.

In box 7, have them choose how they will start the animation of the animal they chose as prey.

Display the fourth page of the Think Sheet

Explain that as they did with their predator, they must tell the computer how to animate the animal they chose as prey. Model your thinking as you complete boxes 8 and 9, and then guide children to complete these steps.

Display the fifth page of the Think Sheet

Call children's attention to the sentence frame. Tell them that as they did in the previous lesson, they will use the sentence frame to plan how they will describe the actions of the predator and prey.

The _____ finds and eats its prey by _____
(predator)

_____

The _____ moves and hides from its predator by _____
(prey)

_____

After you provide a model, have children write their own sentences.

- Remind children that they can use the **Concept Map** or the informational page to help them think of things to write about.
- Also tell children that if they finish and they would like to write more, they may keep going.

Collect the children's **Think Sheets** and tell them that in the next part of the lesson, they will use them to write code using PBS KIDS ScratchJr.

Write Code: Step 1

teacher PREP

DAY 1

1. Launch the PBS KIDS ScratchJr app on your tablet.
2. Make sure you can display your tablet screen using a document camera (such as an ELMO®) or on a whiteboard with a VGA connector or a wireless connection.
3. Gather the tablets used in the previous lesson labeled with each child's name.
4. Children will publish their science reports today. Choose how they will do so and complete the necessary preparation.

   Some choices include:

   - Display it on their tablets and share it in small groups.
   - Display it on a monitor or interactive whiteboard and share it with the class.
   - Post it on a blog and share it with a larger community (e.g.,family members, school)
   - Airdrop it to other PBS KIDS ScratchJr users.

Have children seated at desks or tables so that they will be able to manage both their tablets and their **Think Sheets** as they prepare their science reports. Give each child or pair of children the **Think Sheet** s/he prepared in the previous lesson. Also give a tablet to every child or to each pair of children.

Display your tablet, demonstrating each of the following steps and directing children to do the same on their tablets:

1. Tap the icon for the PBS KIDS ScratchJr app and then tap Start.
2. Locate your project from Lesson 2 and tap it.
3. Choose a new scene (tap the plus sign on the right side of the screen); choose the background icon at the top of the screen; and scroll to find the scene you chose on page 1 of your **Think Sheet**.
4. Delete Dot by touching and holding until a pink x appears. Tap the pink x.
5. Review how to choose an animal by tapping the plus symbol on the left side of the screen. Choose the predator you selected on page 1 of your **Think Sheet**.

To connect Scene 3 to Scene 2, demonstrate these steps and have the children follow along with you:

1. Tap your Scene 2 to bring it up on the screen.
2. Then tap the Red Block and point out the new scene as a tiny red block.
3. Drag that block to the end of your narrator's code for Scene 2. (This makes the project advance to the next scene when the code is finished.)

Write Code: Step 2

REVIEW

- how to return an object to where it started (the blue button to the right of the green flag)
- how to correct a mistake in the code (starting with the last box, separate the code boxes one at a time; touch the block you want to change and swipe it up and out of the coding space)

Create Scene 3

Using pages 2–6 of your **Think Sheet** as a guide, demonstrate how to code the third scene. Once again, complete one step at a time, pausing each time to allow children to follow your example. As you do so, observe and provide guidance as necessary. See page 20 to review coding instructions.

- With each decision, remind children that the science report must demonstrate what they have learned about how humans can **mimic** animal adaptations. Remind the children that even though you want them to use the **Think Sheet** as a guide, they could revise their plans as they write. "Real" authors do so all the time.
- To check their coding, have the children start their report by tapping either the flag or an animal to see if it works as planned.
- After the children complete their third scene, remind them to tap the Home button at the top left to save their work.
- Close and store the tablets.

Publish

Explain to children that "making their thinking public," sharing with others what they have learned, is an important step in deepening knowledge and understanding. This is because as we share our ideas with others, it helps us to clarify and sometimes even add new information and it helps our "audience" to gain new information or to see ideas from a different point of view.

Possible ways to publish their work include:

- Display it on their tablets and share it in small groups.
- Display it on a monitor or interactive whiteboard and share it with the class.
- Post it on a blog and share it with a larger community (e.g., family members, school).
- Airdrop to tablets of other PBS KIDS ScratchJr users for them to view (including the teacher, parents, friends).

Review, Connect, Reflect

REVIEW

Return to the **Concept Map** and point to the box labeled "Ways Humans Mimic Animal Adaptations."

Ask children if they would like to share any additional information about how humans copy the physical characteristics of animals to solve problems.

Record the information on the **Concept Map**.

CONNECT TO HOME

If children have worked individually, suggest that they take home and share their **Think Sheets** with their family members.

Distribute the **Family Letter** and say,

Tell a family member what you have learned about how predators hunt prey and how prey move or hide to escape from predators. Then choose one or more of the activities described in this letter to do together. As you play, view, or read together, be sure to tell your family members what you have learned about the ways animals and humans adapt to meet their needs and survive.

teacher REFLECTION

- Did most children identify and connect animals' physical characteristics to the ways they meet their needs and survive?

  If not, form a small group of children who need extra help and play Aviva's Powersuit Maker, read related books, or view and discuss Wintertime Creature Powers *again.*

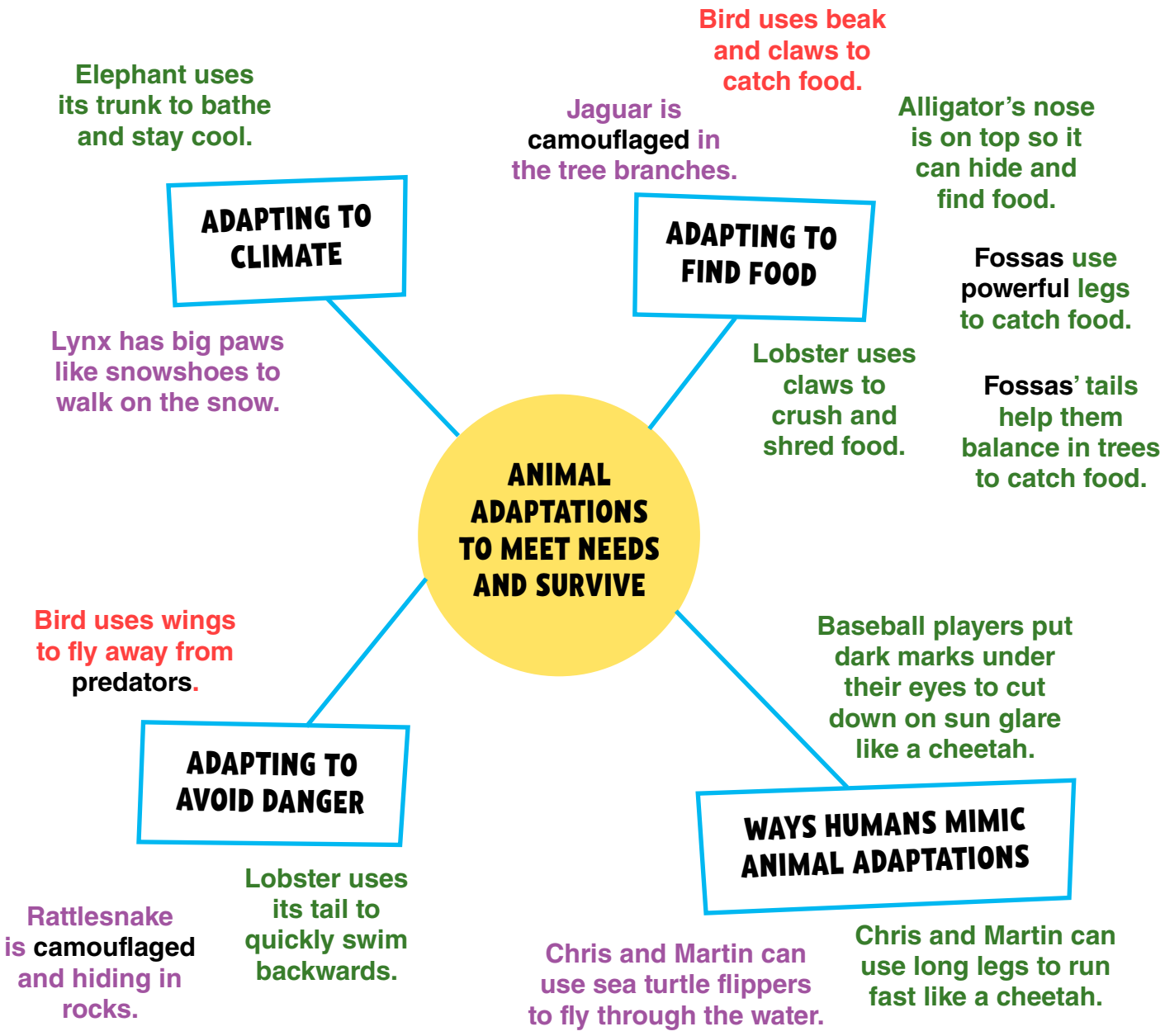
- Were most children engaged with PBS KIDS ScratchJr and able to use it independently?

  If not, provide additional demonstration and guided practice to individuals or small groups before asking children to use it independently.

- Did most children use new vocabulary (camouflage) during and after this activity?

  If not, review the word briefly and use it repeatedly as you continue to study animal adaptation and survival. Prompt children to use the word on their own.

Concept Map


ANIMAL ADAPTATIONS TO MEET NEEDS AND SURVIVE
ADAPTING TO CLIMATE
Elephant uses its trunk to bathe and stay cool.
Lynx has big paws like snowshoes to walk on the snow.
ADAPTING TO FIND FOOD
Bird uses beak and claws to catch food.
Jaguar is camouflaged in the tree branches.
Alligator's nose is on top so it can hide and find food.
Fossas use powerful legs to catch food.
Lobster uses claws to crush and shred food.
Fossas' tails help them balance in trees to catch food.
ADAPTING TO AVOID DANGER
Bird uses wings to fly away from predators.
Rattlesnake is camouflaged and hiding in rocks.
Lobster uses its tail to quickly swim backwards.
WAYS HUMANS MIMIC ANIMAL ADAPTATIONS
Baseball players put dark marks under their eyes to cut down on sun glare like a cheetah.
Chris and Martin can use sea turtle flippers to fly through the water.
Chris and Martin can use long legs to run fast like a cheetah.

LESSON 3

Think Sheet • Page 1

Name _____

1. WHAT HABITAT WILL YOU CHOOSE FOR YOUR KRATT BROTHER?

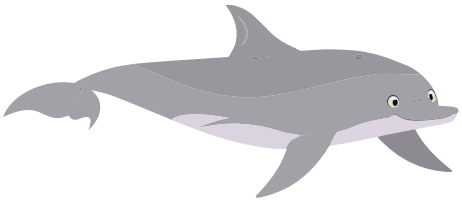
riverbank

savannah

jungle

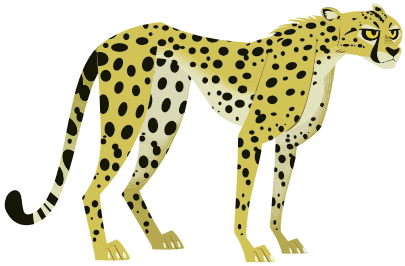
ocean

2. WHICH ANIMAL IS YOUR PREDATOR?



dolphin

harpy eagle



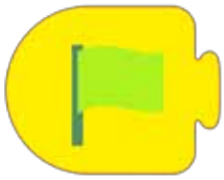
cheetah

crocodile

Think Sheet • Page 2

Name _____

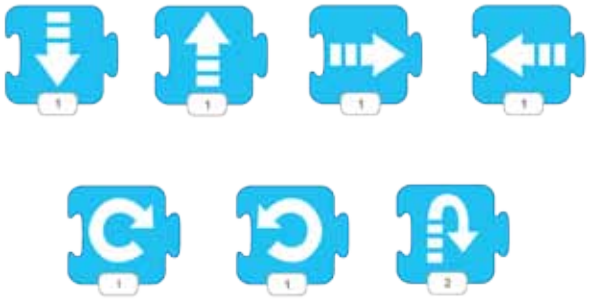
3. HOW WILL YOU START THE ANIMATION OF YOUR PREDATOR?



Touch flag

Touch animal

4. HOW WILL YOU ANIMATE YOUR PREDATOR TO CHASE ITS PREY?

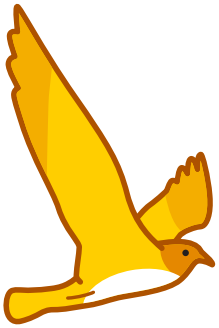


5. HOW FAR WILL YOU MOVE YOUR PREDATOR?

Think Sheet • Page 3

Name _____

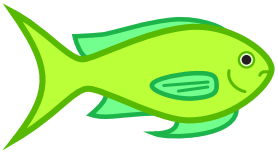
6. WHICH ANIMAL WILL YOUR PREDATOR HUNT?



bird

rabbit

frog



fish

7. HOW WILL YOU START THE ANIMATION OF YOUR PREY?

Touch flag

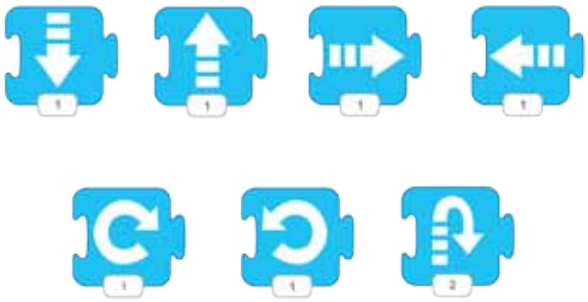
Touch animal

LESSON 3

Think Sheet • Page 4

Name _____

8. HOW WILL YOU ANIMATE YOUR PREY TO RUN AND HIDE FROM ITS PREDATOR?



9. HOW FAR WILL YOU MOVE YOUR PREY?

Think Sheet • Page 5

Name _____

10. HOW DOES YOUR PREDATOR HUNT ITS PREY?

Tap microphone to record

Think Sheet • Page 6

Name _____

11. HOW DOES YOUR PREY RUN AND HIDE FROM ITS PREDATOR?

Tap microphone to record

LESSON 3

Family Letter

Dear Families:

We are continuing our unit on animal adaptations with help from the PBS KIDS® series *Wild Kratts*. This week we learned how predators and prey sometimes hide using **camouflage** to survive in their habitat. Here are some ideas you can use to reinforce this concept at home.

Talk Like a Scientist!

To help your child learn and use important vocabulary, use these words as you talk about and explore animal adaptations:

camouflage **prey** **predator**

Explore at Home.

Play a game with your child: Have your child gather several small toys and then try to find places (inside or outside) each can be **camouflaged** or hidden. Ask questions like this:

- **Why do animals sometimes use camouflage?** *(**Camouflage** helps prey hide from predators so they won't get caught and eaten. Sometimes the predators are **camouflaged** to sneak up on the prey without being seen.)*
- If you have more than one child, one can hide while the other hunts!

Watch Together.

In these two videos, the Kratt brothers explore how giraffes and an octopus use **camouflage** to survive and meet their needs.

- *Taking a Break (giraffes)* to.pbs.org/2bM4nsR
- *Octopus Power!* to.pbs.org/2qguCTN

As you watch with your child, ask questions like these:

- **Why does the giraffe or octopus use camouflage? How does it help them survive?**
- **What does a giraffe eat? Is it a predator or prey?**
- **What does an octopus eat? Is it a predator or prey?**

Read Together.

Visit your local library to check out books that will help your child think and talk about animal adaptations. Recommendations include:

- *Living Color?* by Steve Jenkins
- *Where in the Wild? Camouflaged Creatures Concealed and Revealed* by David Schwartz and Yael Schy

LESSON 3

Carta a las Familias

Estimadas familias:

Seguimos trabajando en nuestra unidad sobre las adaptaciones animales con la ayuda de la serie *Wild Kratts* de PBS KIDS®. Esta semana aprendimos como los depredadores y las presas a veces se ocultan usando el camuflaje para sobrevivir en su hábitat. He aquí algunas ideas que pueden utilizar para fortalecer el concepto en casa.

¡Habla como un científico!

Para ayudar a su niño a aprender y a utilizar vocabulario importante, utilice palabras como éstas al hablar y explorar las adaptaciones animales:

camuflaje **depredador** **presa**

Explorar en el hogar.

Realice un juego con su hijo: haga que su hijo reúna varios juguetes pequeños y que luego trate de encontrar lugares (adentro o afuera) dónde cada uno puede **camuflarse** o esconderse. Si tiene más de un niño, uno de ellos puede esconder mientras que el otro busca. Haga preguntas como ésta:

- **¿Por qué a veces los animales usan el camuflaje?** *(El **camuflaje** le ayuda a una presa a ocultarse de sus **predadores** para que no los cachen y se los coman. Algunas veces los **predadores** se **camuflan** para acercarse a hurtadillas a su presa sin ser vistos.)*

Ver juntos.

En estos dos videos, los hermanos Kratt exploran cómo las jirafas y un pulpo utilizan el **camuflaje** para sobrevivir y satisfacer sus necesidades.

- *Taking a Break (giraffes)* to.pbs.org/2bM4nsR
- *Octopus Power!* to.pbs.org/2qguCTN

Al verlos junto con su hijo, haga preguntas como éstas:

- **¿Por qué la jirafa o el pulpo usan camuflaje? ¿Cómo les ayuda a sobrevivir?**
- **¿Qué come una jirafa? ¿Es un depredador o una presa?**
- **¿Qué come un pulpo? ¿Es un depredador o una presa?**

Leer juntos.

Visiten su biblioteca para sacar libros que le ayudarán a su hijo pensar y hablar acerca de las adaptaciones animales. Las recomendaciones incluyen:

- *Living Color?* por Steve Jenkins
- *Where in the Wild? Camouflaged Creatures Concealed and Revealed* por David Schwartzy Yael Schy

LESSON 4

Preview

INVESTIGATION

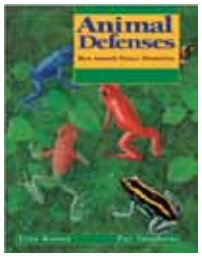
Investigate the question of animal coloration in winter with an experiment using melting ice cubes. Which color fur keeps an animal warmer in winter, black or white? Students will observe two melting ice cubes under a source of heat, one surrounded by black paper and the other surrounded by white. After the experiment is finished, students will work to collect measurement data, display the data on a graph, analyze their results, and connect the results to real-world problems.

TEACHER READ ALOUD

A Warm Winter Tail by Cassie A. Pearson and Christina Wald

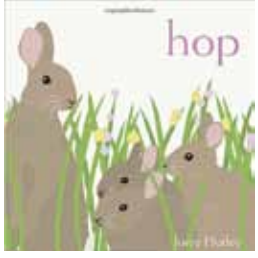
Through engaging texts and illustrations, young animals question how humans keep themselves warm and survive in winter—an interesting twist in exploring the relationship between animals' characteristics and humans' problem-solving.

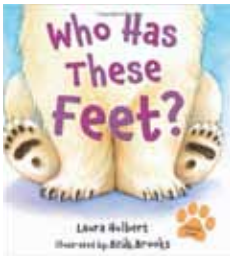
EXPLORE IN SMALL GROUPS



Through reading, discussing, and sharing engaging informational texts, children will continue to connect their understanding of the ways animals use their physical characteristics to survive to the ways humans improve performance and ability to solve problems by mimicking animals' features. For this part of the lesson, your text set should include 6–8 books (borrowed or purchased). In addition to others used in this unit, your text set might include:

Animal Defenses: How Animals Protect Themselves by Etta Kaner
Creature Features by Steve Jenkins and Robin Page
Fins, Wings and Legs by Margaret Clyne and Rachel Griffiths
Have You Ever Seen a Duck in a Raincoat? by Etta Kaner
Hop by Jorey Hurley
How Many Ways Can You Catch a Fly? by Steve Jenkins and Robin Page
Nothing Like a Puffin by Sue Soltis
What Do You Do When Something Wants to Eat You? by Steve Jenkins and Robin Page
What if You Had Animal Ears? by Sandra Markle
Who Can Live in the Mountains? by Sheila Anderson
Who Has These Feet? by Laura Hulbert
Winking, Blinking, Wiggling and Waggling by Brian Moses





Objectives

Lesson SEQUENCE

DAY 1 15 minutes
Formulate a Question
Make a Hypothesis

DAY 2 40 minutes
Get Ready to Investigate
Observe and Record

DAY 3 30 minutes
Analyze the Data
Conclude and Record

DAY 4 30 minutes
Make a Difference
Connect and Reflect

In this lesson, children will:

- Use the scientific method to answer a question.
- Hypothesize the answer to a question.
- Observe and record the results.
- Graph the results of an experiment.
- Connect the results to real-world problems and solutions.
- Acquire and use vocabulary and concepts including **analyze, conclude, data, experiment, hypothesize, record.**
- Use technology to learn, working individually and in groups.

Set Up a Science Learning Center

teacher PREP

SETTING UP THE INVESTIGATION

1 Equip two or more Science Learning Centers with the following materials:

- a source of light (a small goose-neck lamp works best)
- 2 small transparent plastic cups (1oz. cups work best)
- 2 ice cubes of equal size and shape (rectangular cubes work better than crescent cubes)
- 4 squares of construction paper, 2 white and 2 black, cut in equal sizes (about twice the size of the ice cube)
- Timer (or the class clock) to record data every 10 minutes for 30 minutes
- 20 pennies to measure the height of the melted water
- A sharpie to make marks on the plastic cups
- **Observe and Record** handout for each child
- **Analyze and Conclude** handout for each child

2 Prior to the lesson, conduct the **investigation** on your own under the expected conditions.

3 Adjust parameters as necessary to make the **investigation** successful (e.g., have children measure the height of the water every 5 minutes instead of every 10, etc.)

NOTE: *It is helpful to have extra cups and ice cubes in each* ***experimental*** *condition—so that a spilled cup can be readily replaced by one of the extras.*

At each Science Learning Center:

1 Position two plastic cups under the lamp making certain that each will receive the same amount of heat/light. It works best if the light is about 5 inches above the cups.

2 Place a black square of construction paper below one cup and a white square of construction paper below the other cup.

3 When you are ready to begin the **experiment**, place one ice cube in each cup and place the corresponding piece of construction paper on top of each ice cube.

Formulate a Question

teacher PREP

DAY 1

1. Display the image of an otter that is on this page or find a similar one.
2. Prepare enough copies of the **Observe and Record** page and **Analyze and Conclude** page for each child, found on pages 82 and 83.
3. To diminish the likelihood that the small cups will be dropped or spilled by children, the lesson plan directs the teacher to mark the water height on each cup at each observation point. Alternatively, teachers may choose to set up multiple **experiments**—having extra cups and ice cubes in each **experimental** condition—so that a spilled cup can be readily replaced by one of the extras.
4. Gather drawing paper and crayons, markers, and pencils for children to use to prepare a poster.

Display the **Concept Map** and prompt children to recall what they have learned. Then help them ask questions like a scientist.

Display the image of an otter in snow. Tell children to observe the otter's physical characteristics and surroundings:

- After a few seconds, have them turn and tell their partner what they notice.
- Then say: **When you look at this image, what are you curious about?**
- Invite a few children to share their curiosities, and as they do, ask them to connect their questions to adaptation. Provide a model if necessary (e.g., **I noticed the otter's big nose and I wondered if its big nose helps it find food under the snow**).

Explain that scientists often use their observations and curiosities to create questions to investigate. Tell them that when you looked at the image, you noticed that the otter's dark fur does not camouflage it in the white snow. Say, **So that made me wonder: Why does the otter have dark fur?**

Explain that in the next part of the lesson, like "real" scientists, they will conduct an **experiment** to see if they can figure out at least one reason why animals who live in a snowy habitat have dark fur.

Make a Hypothesis

To help children develop a disposition toward scientific thinking, explain that scientists often begin an **experiment** by making an **hypothesis**, or a good guess, about the answer to an important question.

To prompt children to make an **hypothesis**, say, **The otter lives in a snowy climate—its fur is dark—does anyone have a good hypothesis or guess about why dark fur might be helpful to the otter?**

Invite volunteers to share their **hypotheses**. Then building on a child's guess (or if no child suggests it, your own) that dark fur might keep the otter warmer than white fur, tell children that they can conduct an **experiment** to see if dark fur might keep animals warmer.

Call children's attention to the materials in the Science Learning Center and explain that to test their **hypothesis**—dark colors provide greater warmth than light colors—they will use ice cubes surrounded by either light or dark paper.

- Explain that if dark colors soak up more heat from sun or a light, the ice surrounded by the dark paper will be warmer and melt faster. The ice surrounded by the white paper will be colder and will melt more slowly.
- Say, **Let's each make our own guess. Raise your hand if you think the ice cube will melt faster if it is covered in white.**

Explain that in the next part of the lesson, they will conduct the experiment to see what really happens.

Get Ready to Investigate

teacher PREP

DAY 2

1 Prepare enough copies of the **Observe and Record** page and **Analyze and Conclude** page for each child.

2 Borrow or purchase the book *A Warm Winter Tale* by Carrie A. Pearson and Christina Wald.

3 For this part of the lesson, you also will need 6–8 books (borrowed or purchased) for children to use to gather information while the **investigation** is underway. In addition to books previously used in this unit, your text set might include:

- *Animal Defenses: How Animals Protect Themselves* by Etta Kaner
- *Creature Features* by Steve Jenkins and Robin Page
- *Fins, Wings and Legs* by Margaret Clyne and Rachel Griffiths
- *Have You Ever Seen a Duck in a Raincoat?* by Etta Kaner
- *Hop* by Jorey Hurley
- *Nothing Like a Puffin* by Sue Soltis
- *Who Has These Feet?* by Laura Hulbert

Situate children at a Science Learning Center equipped with everything but the ice cubes (see page 67).

Develop Understanding that Experimental Conditions Must Be the Same

To help children understand the importance of creating comparable conditions for testing a **hypothesis**, demonstrate that in this **investigation** they will change only the color of the paper that surrounds the ice.

- Point out and explain the purpose of each item (the plastic is like the otter's body and it will be used to hold the ice; the black and white construction paper is like the otter's fur—the black paper mimics black fur and the white paper mimics white fur; the light is like the sun—it will provide heat or warmth like the sun does.
- Verify that in both "sides" or conditions, only one item is different: In one condition they will use white paper, and in the other they will use black paper.

Get Ready to Observe and Record Data

Distribute the pennies and the **Observe and Record** page. Tell children that:

- Each time they check the experiment, you will use a sharpie to mark the height of the water in each cup.
- After the final observation, they will measure the water height at each time point by stacking and counting the pennies to see "how many pennies high" the water is. (To demonstrate quickly, display a cup with a little water in it, mark the water height with a sharpie, and stack pennies up to the mark and count.)
- Then they will record their measurements—"how many pennies high" the water was at each time point—on the **Observe and Record** page.

Observe and Record

Start the Experiment

Place the ice in each cup. Have children position the correct color paper on top of each ice cube. Set the timer for 10 minutes. Then follow these steps:

- On the **Observe and Record** page, point to the first row (0 minutes). Prompt children to notice that the ice has not yet started to melt, so there is no water. So the first measurement is 0 pennies high. They should **record** "0" in both columns.

Teacher Read Aloud (as you wait for first observation point)

As you wait for the first observation point, read aloud all or part of *A Warm Winter Tail*. As you read, prompt children to carefully observe the illustrations and notice how humans mimic animals' physical characteristics to meet their needs. Ask them to share what they notice and add new information to the **Concept Map**. After approximately 10 minutes, return to the **experiment**.

- Have children observe the ice cube melting and mark the water height. As you guide children's observations, use (and prompt children to use) scientific terms (e.g., **collecting data, hypothesis, experiment**). If the outside of the cup is moist you may need to re-draw the water mark to maintain its visibility.

Children's Book Groups (as you wait for the next observation points)

As you wait for the second observation point, divide children into small groups (3–4 children) and provide each group with one or two books from the text set on animal adaptations. Tell the children that their task is to find at least one new idea about a way an animal uses its physical characteristics to meet its needs and survive. Give each group a sticky note on which to **record** their new information. After about 10 minutes (20 minutes after the start), call children's attention back to the **investigation**.

- Have children observe the ice cube melting and again mark the water height on each cup. If necessary, re-draw each water mark to maintain visibility.

As you wait for the final observation point, have children share the ideas on their sticky notes. Guide them to post the notes connected to the appropriate box on the **Concept Map**. After about 10 minutes, once again call attention to the experiment.

- Have children observe the ice cube melting and again mark the water height in each cup.
- Then guide children to use the pennies to measure the height of the water at each observation point and to **record** the **data** on the **Observe and Record** page.

Tell children that in the next part of the lesson, they will review and **analyze** the data and draw a **conclusion** about what they learned. Remind children to write their names on their **Observe and Record** page and collect them for use in the next part of the lesson.

Analyze the Data

Distribute children's **Observe and Record** pages from the previous lesson.

Tell them to look at the data that tells how many pennies high the water in each cup was at the last observation. Call on volunteers to answer these questions:

- How many pennies high was the water in the cup surrounded by black paper?
- How many pennies high was the water in the cup surrounded by white paper?

Then distribute the **Analyze and Conclude** chart and complete these steps:

1 Read the question at the top of the page. Model how to color in or shade the spaces to complete a bar graph to display their **data**.

2 Have children complete their own graphs.

3 Have children work with a partner to read and respond to the two questions.

4 Read the sentence stem and have each child write their own conclusion.

Conclude and Record

To help children connect their **investigation** to their study of how animals use their physical characteristics to meet their needs and survive, once again display the photo of the otter in its snowy habitat.

- Recall the earlier discussion about the color of the otter's fur—why might it be dark? Could dark fur keep the otter warmer than white fur?
- Remind students that to figure out the answer to that question, they planned the ice cube **investigation**. Say, **If the ice covered with white paper melted faster, that would mean that a white cover or white fur might keep an animal warmer. If the ice covered with black paper melted faster, that would mean that a dark cover or dark fur might keep an animal warmer.** Ask children:
  - **In our investigation, what did the data tell us? Which color—black or white—made the cup warmer?**
  - **What conclusion can we draw?** (dark fur will keep an animal warmer that white fur)

Finally, call children's attention to the category on the **Concept Map**, "Adapting to Climate." Ask them to add their finding (e.g., otter's dark fur keeps in warm in winter.)

Wrap up by telling children that in the next lesson they will think about how they might use all of the information they've learned about animal adaptations to solve "real-life" problems and make a difference in the world.

Make a Difference

teacher PREP

DAY 4

Gather drawing paper and crayons, markers, and pencils for children to use to prepare a poster.

Remind children that knowing the ways animals use their physical characteristics to meet their needs and survive helps humans figure out ways to meet their needs and survive.

On the **Concept Map**, focus children's attention on how humans mimic animals' characteristics. Then tell them to think about a time when *they* mimicked an animal's characteristic to meet their needs or to improve their own performance. Brainstorm a few ideas (e.g., wearing fins that act like a duck's webbed feet and swim faster; wearing a raincoat that is slick like a bird's feathers to stay dry in rain; building an vehicle with wings to fly like a bird.

Tell them that they will make a poster showing and telling about their experience (or their new idea).

- Distribute drawing paper and writing utensils (pencils, crayons, markers).
- Tell the children to illustrate the event or the idea and to write a sentence (or more) that tells what animal characteristic they mimicked and how it helped them meet their needs or improve their performance.

To develop children's awareness that we all learn best when we share what we know with others, provide one or more ways for the children to share their posters. For example, you might:

- Convene children as a whole group and invite a few children to share their posters. Invite those who do not have an opportunity to share to post their work on a display board for all to see.
- Scan and upload the posters to a classroom website to share with parents and the entire school community.
- Create a blog where students can post their work and receive and respond to the comments of others.
- Have children audio record their descriptions and attach a QR code that, when scanned using a mobile device, would allow parents, siblings, or friends to hear the children describe their posters. For more information (and easy directions), visit tammyworcester.com/audio-qr-codes/

Connect and Reflect

CONNECT TO HOME

- Encourage children to take home their **Observe and Record** and **Analyze and Conclude** pages and describe the **experiment** to family members.
- Distribute the **Family Letter** and say, **Tell a family member what you have learned about conducting an experiment to answer an important question. Choose one or more of the activities described in this letter to do together. As you do the experiment or play, view, or read together, talk about "thinking like a scientist" and what you have learned about the ways animals and humans adapt to meet their needs and survive.**

teacher REFLECTION

- Were most children able to use what they had learned about animal adaptations to make a logical hypothesis about why the otter's fur is dark?

  If not, form a small group of children who need extra help and read related books.

- Were most children engaged in observing and measuring during the experiment?

  If not, repeat the experiment with a small group to give them additional practice in "acting like a scientist."

- Did most children use new vocabulary (conclude, data, experiment, hypothesis, record,) during and after this activity?

  If not, review the words briefly and use them repeatedly as you continue to develop children's ability to "think and act like scientists." Prompt children to use the words on their own.

Concept Map


ANIMAL ADAPTATIONS TO MEET NEEDS AND SURVIVE
ADAPTING TO CLIMATE
Elephant uses its trunk to bathe and stay cool.
Otter has dark fur to keep its body warm.
Lynx has big paws like snowshoes to walk on the snow.
ADAPTING TO FIND FOOD
Jaguar is camouflaged in the tree branches.
Bird uses beak and claws to catch food.
Alligator's nose is on top so it can hide and find food.
Fossas use powerful legs to catch food.
Lobster uses claws to crush and shred food.
Fossas' tails help them balance in trees to catch food.
ADAPTING TO AVOID DANGER
Bird uses wings to fly away from predators.
Rattlesnake is camouflaged and hiding in rocks.
Lobster uses its tail to quickly swim backwards.
WAYS HUMANS MIMIC ANIMAL ADAPTATIONS
Baseball players put dark marks under their eyes to cut down on sun glare like a cheetah.
Chris and Martin can use sea turtle flippers to fly through the water.
Chris and Martin can use long legs to run fast like a cheetah.

LESSON 4

Family Letter

Dear Families:

We have finished our unit on animal adaptations with help from the PBS KIDS® series *Wild Kratts*. This week we did an **investigation** to find out if some colors (white or black) make an ice cube melt more quickly or more slowly. We learned that the ice cube surrounded by dark colors melted more quickly, and we **concluded** that animals with dark fur stay warmer than animals with light-colored fur, and people wearing dark-colored clothing might stay warmer than people wearing light-colored clothing!

Talk Like a Scientist.

To help your child learn and use important vocabulary, use these words as you talk about and explore conducting an **investigation**:

record **conclude** **analyze** **data**

Explore at Home.

- Try an investigation at home with clothing in the sun. Have your child wear all dark clothes and sit out in the sun for 10 minutes. **Record** together with your child how they feel at the beginning and end of the 10 minutes. Change clothes to all light-colored clothing and sit outside for another 10 minutes. **Record** how they feel at the beginning and end of the 10 minutes.
- Ask, **Which color soaked up more heat and made you feel hotter?**

Watch Together.

River otters have dark fur and stay active all winter. Watch these *Wild Kratt* videos to learn more about how animals use their physical features to meet their needs and survive.

- *Sledding Otter Style (river otters)* to.pbs.org/2bH3g09
- *Wintertime Creature Powers!* to.pbs.org/2c4kwOe

As you watch with your child, ask questions like these:

- **What adaptations help the animals stay warm in winter?**
- **How does an otter's coat keep it warm even when sledding on snow?**

Read Together.

Visit your local library to check out books that will help your child think and talk about animal adaptations. Recommendations include:

- *A Warm Winter Tail* by Carrie Pearson
- *What if You Had Animal Hair!?* by Sandra Markle

LESSON 4

Carta a las Familias

Estimadas familias:

Hemos terminado nuestra unidad sobre adaptaciones animales con la ayuda de la serie *Wild Kratts* de PBS KIDS®. Esta semana hicimos un **experimento** para averiguar si algunos colores (blanco o negro) hacen que se derrita un cubo de hielo más rápidamente o más lentamente. Aprendimos que el cubo de hielo rodeado de colores oscuros se derrite con más rapidez y **llegamos a la conclusión** de que los animales con pelaje oscuro se conservan más calientes que los que tienen el pelaje de color claro, y que la gente que usa ropa de color oscuro puede mantenerse más caliente que la gente que usa ropa de color claro.

¡Habla como un científico!

Para ayudar a su niño a aprender y a utilizar vocabulario importante, utilice estas palabras mientras habla y explora la ejecución de un **experimento**:

registro **concluir** **análisis** **datos**

Explorar en el hogar.

Intente hacer un experimento en casa con la ropa y poniéndose al sol. Haga que su hijo use toda la ropa oscura y que se siente al sol durante 10 minutos. Registre junto con su hijo cómo se sintió al principio y al final de los 10 minutos. Cambie de ropa y que se ponga toda de color claro y se siente afuera por otros 10 minutos. **Registren** cómo se sintió al principio y al final de los 10 minutos.

- Preguntar: **¿Qué color absorbió más calor y te hizo sentir más caliente?**

Ver juntos.

Las nutrias de río tienen el pelaje oscuro y se mantienen activas durante todo el invierno. Miren estos videos de Wild Kratt para aprender más sobre cómo los animales utilizan sus características físicas para satisfacer sus necesidades y sobrevivir.

- *Sledding Otter Style (river otters)* to.pbs.org/2bH3g09
- *Wintertime Creature Powers!* to.pbs.org/2c4kwOe

Mientras lo ve con su hijo, haga preguntas como éstas:

- **¿Qué adaptaciones ayudan a los animales a mantener el calor durante el invierno?**
- **¿Cómo el pelaje de la nutria la mantiene caliente incluso cuando se desliza en la nieve?**

Leer juntos.

Visite su biblioteca para sacar libros que le ayudarán a su hijo a pensar y a hablar acerca de las adaptaciones animales. Las recomendaciones incluyen:

- *A Warm Winter Tail* by Carrie Pearson
- *What if You Had Animal Hair!?* by Sandra Markle

Observe and Record

Name _____

RECORD THE HEIGHT OF THE MELTED WATER IN NUMBER OF PENNIES		
Time	**Black**	**White**
0 minutes		
10 minutes		
20 minutes		
30 minutes		

Analyze and Conclude

Name _____

After 30 minutes under the light, how many pennies high was the water in each condition?

HEIGHT OF THE MELT-WATER AFTER 30 MINUTES (NUMBER OF PENNIES)		
23		
22		
21		
20		
19		
18		
17		
16		
15		
14		
13		
12		
11		
10		
9		
8		
7		
6		
5		
4		
3		
2		
1		
0		
	White	**Black**

Which ice cube melted faster?

____the ice covered with black paper

____the ice covered with white paper

Which color paper made the air around the ice cube warmer?

____black

____white

Write your conclusion:

Animals that live in cold winter climates may have black fur because _____

Credits

These Teaching Tips were developed by PBS in partnership with the Boston University School of Education.

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Wild Kratts

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